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Agriculture

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The Small Farms of Northern Ireland . . . . *V. Liversage*

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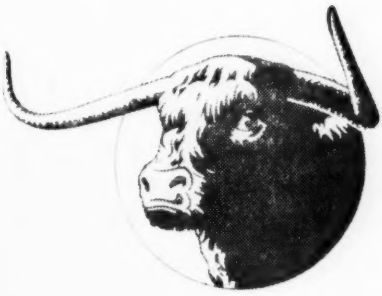

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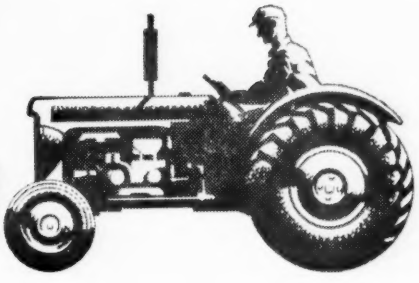

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Agriculture

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Potato Harvesting

the Easier Way

THE past few years have seen many innovations in potato harvesting, prompted by the difficulty of getting enough skilled gang workers, and by the increasing importance of gathering damage-free potatoes. One new method has provided yet another use for the tractor's hydraulic foreloader.

Adapted to carrying boxes of potatoes, the foreloader can replace the picking of potatoes into bags or the emptying of baskets into trailers. Boxes made of wood and holding 5–10 cwt of potatoes are placed at convenient intervals in the field. The pickers can fill one of these boxes in much less time than they would take to fill 5 or 10 sacks. A tractor with foreloader comes along and is manoeuvred so that the arms of the foreloader slide under bearers on the box to lift it from the ground. The box is carried to the trailer and tipped slowly.

On some farms, one man with a foreloader of this kind has been able to do the work of two men emptying the pickers' baskets into trailers by hand. The heavy lifting and carrying are done by hydraulics, but the man operating the tractor must be skilled if the potatoes are to fall into the trailer without damage.

Where the potato field is within reasonable distance of the clamp or store, it is worth while to carry a second box, on a rear loader, as well as the one on the foreloader, and tip the boxes direct on to the clamp or store without the use of trailers.

Why Wheat?

Mr. Burr, in his article in the January issue of 'Agriculture', outlined the basic principles of the 'gross margin' technique of farm planning. In this article ***G. J. CLARKE*** *illustrates the application of that technique to winter wheat in relation to other enterprises on the farm*

'If, when I started farming, I did what I am doing today, I should have been shot.' 'My whole farm is under cereals.' 'I am now experimenting with three successive wheat crops and so far have had no serious trouble.' One often hears such comments, and they refer of course to the increasing policy in some areas of taking three or even more successive white straw crops. The remnants of the Norfolk four-course rotation are fast disappearing and almost continuous cereal growing is becoming a possibility on many farms in certain parts of the country. How long this can go on remains to be seen, and those engaged in advisory work are keeping close watch for signs of increasing diseases and pests.

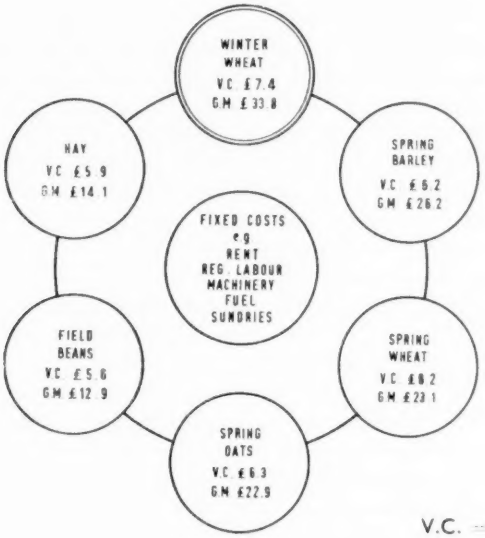
It should be emphasized that in many areas this policy would be quite impossible because of the diseases Take-all and Eyespot, and the pests cereal root and stem eelworms. Nevertheless, there is no doubt that on traditional wheat soils farmers can now plan their cereal cropping with greater freedom than in the past. Bearing this in mind, it will become obvious, after only a cursory examination of profit margins, that the maximum acreage of wheat should be grown.

More profit from winter wheat

The capital and labour requirements are similar for all cereals, and the gross margin technique for comparison of profitability is particularly applicable. Gross margins are calculated by subtracting the variable costs of seed, fertilizers, sprays and casual labour, from the return for the crop concerned. For example, the position for winter wheat on a farm may be:

	£	*s.*
30 cwt per acre at £27 per ton (incl. £8 10*s.* subsidy) ..	40	10
Cost of seeds, fertilizers and sprays ..	8	0
Gross margin ..	32	10

Typical figures for East Anglia are:



V.C. = variable costs p.a.
G.M. = gross margin

It will readily be seen that winter wheat is substantially more profitable than other comparable crops which have to share the farm's capital, labour and machinery. In fact, at present prices wheat yields could well fall 15 per cent, and it would still compare favourably with barley at present prices.

Winter wheat is, however, the most exacting cereal crop to grow, and while the maximum acreage should be grown, care has to be taken to see that it is not over-done. Only the individual farmer or his local adviser, can give a balanced judgment on this point. But provided due regard is paid to using varieties reasonably tolerant to diseases, particularly Eyespot, there are indications that much more wheat could be grown in some localities in the future.

Two main factors

There are two main factors concerned with the gross margins of winter wheat. The type of soil is obviously of great importance, but is outside the farmer's control.The other factor of major importance is the rate and time of

applications of spring top dressings of nitrogen. Extensive trials by the N.A.A.S. over the country as a whole indicate that the correct rate of nitrogen depends upon climatic conditions and the level of soil fertility. For instance, 60 units of nitrogen (the equivalent of about 3 cwt per acre sulphate of ammonia) applied in the West Midlands, Yorkshire and Lancashire, will give, on average, an extra 7 cwt per acre of grain. In other words, gross margins per acre are increased by seven times 27*s*. (= £9 9*s*.) less the cost of the fertilizer, i.e., £1 16*s*. (=£7 13*s*.). These are average figures; on many farms considerably higher rates of nitrogen would be justified. Average figures for the Eastern Counties are less, 60 units giving an extra 4 cwt per acre of grain. The lower the fertility of the soil the greater is the response to nitrogen, and on some soils, with correct manuring, 11 cwt per acre or more extra yield can be obtained.

The labour angle

The obvious difficulty of maximizing the wheat acreage is the problem of the autumn work involved, especially where potatoes and sugar beet are also grown. The percentage of the farm, apart from husbandry considerations, on which comparatively low profit crops, such as cereals, can be grown, will depend upon the size of the farm. A net farm income of £6 or £7 per acre, may be quite satisfactory for the 1,000-acre farmer, but it is totally insufficient for the small farmer. The large arable farmer requires a simplified system of farming which usually involves comparatively low profitability per acre, and he frequently regards cereals as his main enterprise.

On many Cambridgeshire farms, the only substantial enterprise is cereals with, so far, no serious signs of deterioration in cropping capacity. The correct balance of cereals and break crops or fallows, is therefore of major importance.

On such farms two gross margins for wheat could well be used—one for where the crop follows a break (say £33) and the other for where it follows a cereal (say £28). If in practice this reduction following another straw crop actually happens, then the gross margin technique can easily cope with the situation.

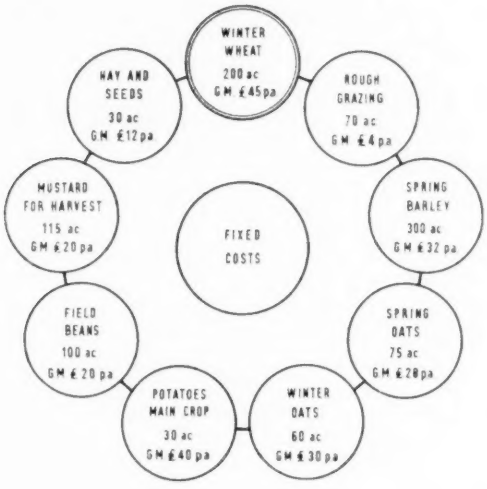
In other areas, there is no doubt that successful wheat crops can only be grown following a 'rest' crop of some kind. Here, labour needs of the rest crop and its succeeding wheat crop must fit: e.g., sugar beet provides a good rest, but it is not an easy crop for winter wheat to follow. *But*, the *combination* of beet and barley gross margins may still be better than, say, beans and wheat.

On the large farm, the autumn work-load problem becomes crystallized into mechanizing the ploughing, cultivating and drilling of a large acreage. On the small farm, fixed costs are relatively higher and net returns per acre must be greater in order to provide a reasonable standard of living. Crops carrying higher gross margins, such as maincrop potatoes (£55 per acre), sugar beet (£61 per acre) or brassicas, will become of major importance, but usually involve increased autumn work problems. Under these conditions, increased mechanization of the root and potato crops is necessary so as to allow more opportunity for wheat sowing.

One of the essentials of crop planning is, therefore, to make sure that labour and machinery supplies are adequate, given average weather conditions. The completion of a labour distribution chart then becomes essential, making full allowance for shorter autumn days and more inclement weather.

A Cambridgeshire farm

An example of the cropping of one large Cambridgeshire farm is as follows:



980 acre farm

This heavy land farm, which is eminently suitable for winter wheat, has eight crop enterprises, and an overall gross margin of £28,640, with an average per acre of approximately £29 5*s*. The annual cost of farm labour is £7,000. A simplified rotation of wheat, wheat, barley, break crop (beans or mustard) gives a total gross margin of £32,230 and an average of about £33 per acre. On husbandry grounds there appears to be, in this particular locality, no serious risk of reduced yields by the greater intensification of cereals, although weeds such as black-grass could well become a problem.

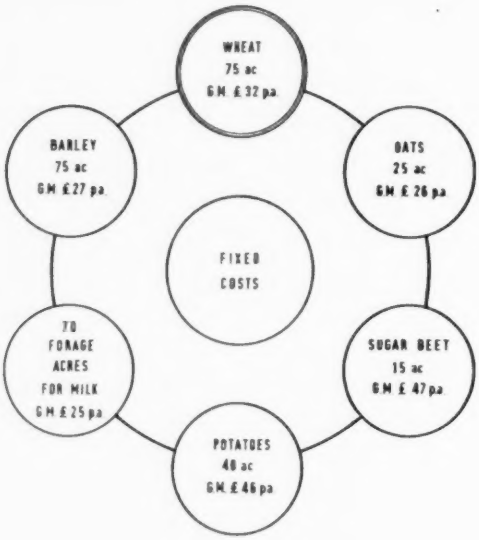
A more streamlined policy along these lines might well lead to reduced labour costs and, with the possibility of a certain amount of autumn work being done by contractors, the farmer concerned envisages the time when his 980 acres might be farmed with a permanent labour force of four or five men.

Wheat instead of milk

The number of dairy herds in Cambridgeshire over the past few years has halved. Much the same process has been going on in other arable counties. This development has occurred because farmers have realized that alternate husbandry is not essential for the maintenance of high crop yields. The release of capital from the sale of dairy cows, together with the reduction in weekend work, has also been attractive. Indeed, as a short-term policy, this change has often had the effect of raising farm incomes with reduced capital investment and diminished anxiety.

Reference to farm data reveals that, on average, winter wheat will give a gross margin per acre which is similar to that given by the dairy herd where forage acres are taken into account. There is, however, great variation in profits from dairy herds, and each individual farm needs to be studied separately.

An actual farm example of the impact of this change-over is as follows:



300 acre farm
36 cows

The total gross margins under the existing system are £9,370, with an average per acre of £31 3*s*. Where the gross margins for milk are as low as £25 per acre, there is always room for improvement, often by greater expenditure on fertilizers for grassland and by other means of decreasing costs of purchased feedingstuffs. On the other hand, a four-course shift of sugar beet or potatoes, wheat, wheat, barley, would give as good a margin as the present system. In comparing the new system with the old, adjustments of the fixed costs will need to be made. In this particular case, the labour of one man might be saved and the cost of additional machinery for cereal handling would need to be weighed against the saving entailed in selling milking and forage machinery.

The outlook for cereals seems satisfactory, at least for the larger farmer, for the time being. There appears to be no possibility of dramatic increases in production per acre in the foreseeable future. There is, however, a great deal of scope for planning cereal cropping, having especially in mind the possibilities of winter wheat.

Mr. G. J. Clarke, N.D.A., is County Advisory Officer for Cambridgeshire in the National Agricultural Advisory Service.

An examination of the question

Should Dairy Cows be Steamed Up?

by **W. H. Broster**

THE example of the outstanding farmer always encourages others anxious to improve their own methods. Not surprisingly, Robert Boutflour's ability to produce high yields of milk from cows, with consequent large profits, attracted considerable attention from dairy farmers in the lean years between the wars. Based on extensive use of concentrated foods, his methods were widely copied. One principle he followed was that the cow must be suitably fed in pregnancy in preparation for the ensuing lactation.

The Boutflour system of 'steaming-up' began about six weeks before calving, when the animal received just a handful of concentrates per day. The amount was gradually built up until, about two weeks before calving, she was receiving an amount equal to three-quarters of the expected maximum ration during lactation. This has become the basis of late-pregnancy feeding of a large proportion of the cows in the national herd. Boutflour insisted, however, that if the cow were to be fed these quantities, then any milk developing in the udder should be removed, even if she had not calved. He termed this 'pre-milking'. Boutflour claimed that udder pressure must be relieved.

This part of his system has not been widely adopted, and it has received little direct attention in research into milk production. The importance of udder pressure to the cow in lactation has been disputed. This summary of research into 'steaming-up' will therefore deal with the feeding aspects only. For simplicity, I define 'steaming-up' as the feeding of concentrated foods in late pregnancy.

In the assessment of 'steaming-up' I think we must put it into perspective in the general context of feeding the cow in pregnancy, rather than attempt to assess it as a 'trick of the trade'. The general question is then: what is the effect of level of feeding in late pregnancy on the lactation of the cow? Here we are concerned with a range of levels of feeding, from under- to over-feeding, as judged by the cow's immediate requirements. In late pregnancy these can be summed up as the food required for maintenance and growth of her own body including udder development, and that for growth of the calf and foetal membranes.

We require information on four main points. First, what are the effects of underfeeding in late pregnancy? Since the cow is not directly productive at this time we are clearly interested in economizing on her. Second, is feeding

Down-calving Friesian heifers being fed individually during steaming-up experiments at the N.I.R.D.

in late pregnancy to meet her immediate requirements adequate? Third, what benefit do we gain from overfeeding her at this time with concentrated foods? Finally, how can feeding in pregnancy be related to feeding in lactation?

Underfeeding in late pregnancy

Dairy farmers in New Zealand base their herd management on spring calving. It occasionally happens that cows calve before the growth of grass starts, and then animals may subsist on poor roughages in late pregnancy and possibly early lactation. Concentrates are used reluctantly because they are expensive relative to the milk prices. Experiments in New Zealand have shown that even short periods of underfeeding in late pregnancy or early lactation lead to depression of yield and milk quality. These adverse effects will persist throughout lactation unless the farmer takes steps to counteract them by high level feeding in the period immediately after calving.

An experiment at Reading has shown that the adverse effects of very poor nutrition before calving are not eliminated by normal levels of feeding (Woodman's standards) after calving. But there is evidence to indicate that they could be offset by additional feeding. The cow will give 0·75 to 1·5 lb extra milk per pound extra concentrates fed per day. Since underfeeding in pregnancy can cause a fall of $\frac{1}{2}$ gallon in peak yield, up to 30 gallons in the yield over the first three months and 100 gallons over the lactation, clearly this expedient is more expensive than the 2–3 cwt of concentrates needed to correct the level of feeding before calving.

Quantity and quality—both s.n.f. and butterfat percentages—are penalized if the cow is allowed to lose condition, to 'go back' towards the end of gestation. Comparable evidence exists as regards the ewe.

Feeding to meet immediate requirements

What happens to milk production if the cow, approaching calving, is fed a ration which will meet her immediate requirements, say, a ration of good quality hay and silage, or poor roughages plus a little concentrates? The cow will be gaining a little weight on these rations, a fact reflected in her condition, at a rate of up to 1 lb per day. Bear in mind that this will include

weight gain of the calf of about $\frac{1}{2}$–$\frac{3}{4}$ lb per day. Under these conditions no adverse effects on milk yield will be met if the cow is fed adequately after calving and given a small 'lead' ration of about 2 lb concentrates per day for the first few weeks. The conclusion must be that if the cow is always fed to meet her immediate requirements then 'steaming-up' is not essential. In other words, feeding concentrates in late pregnancy should be discretionary, not automatic. Condition of the cow, change of condition and weight of the cow are the only guides available in practice.

The difficulty is to assess the quality of roughages, how much the cow will eat of them, and the resultant effect upon her. The situation is complicated by the fact that the intake of the cow will be higher on the better quality, more digestible roughages. 'Steaming-up' at good grass is probably completely wasted effort, but the grass must be of good quality and in plentiful supply.

Overfeeding in late pregnancy

It follows from what has been said that gross overfeeding of the cow before calving is quite unnecessary and is wasteful of food. Some authorities feel that it is advisable to get the cow accustomed to the foods it will receive during lactation. No critical evidence is as yet available on this point and some people may feel justified therefore in giving, say, up to $\frac{1}{2}$ cwt concentrates over the last 3–4 weeks of pregnancy. Variation in feeding before calving above immediate requirements has little effect on milk composition.

Other considerations in 'steaming-up'

In this article I have considered the case of the average cow, capable of lactation yields of about 1,000 gallons of milk, at 4 per cent B.F. We have found that these recommendations apply to the occasional animal which reaches 1,750 gallons. The very high yielder is a separate proposition and the approach must presumably be for an overall stepping-up of level of feeding at all stages.

If we can offset the effects of underfeeding before calving by overfeeding after calving, can we overfeed before calving and economize afterwards? This is a fascinating question, but such evidence as we have suggests that such economy can only be small.

In practical circles 'steaming-up' is associated with bad calving accredited to large calves. Investigations have regularly shown that 'steaming-up' can increase calf weight by 2–3 lb only. This increase seems too small, relative to normal variation in calf weight, to cause this side-effect. One wonders whether the head and shoulders of the calf are more affected than the rest of the body and hence cause difficult calving on occasion. Similarly, the possible relationship of 'steaming-up' and milk fever and ketosis remains to be cleared up.

The few critical weeks

In general, a lot more information on the relationships between pre-calving and post-calving feeding is needed. It is encouraging that detailed work at all stages from practical feeding trials to examination of the biochemical processes involved are in progress. There is no doubt about the critical importance of those few weeks before and after calving to the success and profitability of the lactation as a whole. Hence the need for preparation before calving, as Boutflour stressed, so that the cow can reach her maximum milk

production after calving, even if in that preparation a little food is wasted. On the other hand, research has shown that overfeeding before calving is not essential. It is sufficient if the cow is fed at all times to meet her immediate requirements.

If therefore there is any doubt about the adequacy of the ration, a small 'steaming-up' ration should be given—if only as an insurance that the cow will give of her best without recourse to high level feeding after calving. Both protein and energy are basically important, but a concentrate mixture of the type usually fed at 4 lb per gallon (starch equivalent 65; digestible crude protein 16) is adequate, fortified by a mineral supplement, say 1 per cent each of salt and bone flour and $\frac{1}{2}$ per cent ground limestone. Some $\frac{1}{2}$–$1\frac{3}{4}$ cwt per cow spread over the last six weeks of pregnancy, depending on roughages available, is the range generally found necessary.

Dr. W. H. Broster, B.Sc., Dip. Agric., Ph.D., is a Senior Scientific Officer at the National Institute for Research in Dairying. His particular field is the nutrition of the dairy heifer, and he has been studying 'steaming-up' for ten years.

EARLY LETTUCE from Dutch Light Structures

F. G. SMITH

LARGE-HEADED lettuce come on the British market from southern Europe from the second half of March to mid-May. To compete with this, home-produced lettuce must also be large, a factor which does not combine easily with earliness. Earliness is important, not only to enable the grower to compete with imports, but also to allow him to clear his unheated glasshouses for the timely planting of tomatoes. In some years an early crop of lettuce will meet an exceptionally favourable market, but there must be many seasons when the only virtue of earliness is that it allows the glasshouses to be cleared for tomatoes, which in consequence will produce earlier and more profitable fruit.

Early spring lettuce in a cold structure

Earliness and good hearts

These two factors are mainly influenced by the use of the right variety. We have in Cheshunt 5b and its related varieties a factor for earliness which may be exploited even under cold-house conditions, but heat is required to encourage them to produce hearts of satisfactory size. However, for the harvesting period we now have in mind, lettuce of the Cheshunt 5b type does not produce big enough heads, even when grown in heat.

Lettuces of the May King type will give us what we want, but these for the most part are intolerant of the use of heat to get early maturity, and if grown in a heated house tend to produce large loose heads without satisfactory hearts. Modern breeding work with lettuce has, however, given us varieties of this type, and most of them heart up earlier, even under cold glasshouse conditions—for example, May Princess. Others are tolerant of a little heat to help maturity—for example, Proeftuin's Blackpool and its derivatives. It is among the range of new varieties with these characteristics, some of which are discussed in this article, to which we must look for the size and earliness required.

The use of heat to give us early lettuce for the period mid-March to mid-May must be approached with caution. The market for lettuce is fickle, and demand depends as much on favourable weather, 'salad days', as does the crop itself.

Many growers are now installing low capacity heating systems in their Dutch light structures. For the most part these are hot air units capable of giving only a moderate temperature lift. In so far as heat is used with discretion to give some forwarding of the lettuce crop and permit the early establishment of the tomato crop, the cost of heating may well provide an economic return which will come from the tomatoes rather than the lettuce. But any attempt to get very early crops could be disappointing.

New early varieties

It is fairly obvious that if large-headed varieties can be found which mature early without heat, they will be grown in preference to those which require it, however little the amount. And it seems doubtful whether plant breeders have yet fully exploited the possibility of putting the factor for earliness into

large-headed varieties suitable for growing in unheated houses. Progress was made when May Princess proved a week or ten days earlier than May Queen, and in the newer varieties Amplus, Profos, Kwiek and Kloek promise to be even earlier in maturity than May Princess, while other varieties are as early.

More often than not it is the base of the lettuce which attracts the market buyer, and possibly also the retail customer. A good variety should have a broad flat base with sufficient leaf blade at the base of the mid-rib to overlap. Lettuces which tend to have a pointed base—for example May Princess—pack badly. They are likely to stand above the top of the crate and so are easily damaged when the crates are stacked.

It goes without saying, I think, that a good lettuce must have weight as well as appearance. Very solid hearts, the leaves of which do not separate easily when being prepared for a salad and which may be completely blanched, are not required. And the number of lettuce in a crate does not impress the buyer unless high grade, low number packs are also accompanied by good weight. It would do growers no harm to state the weight of their lettuce packs as well as the number of the grade.

Lettuce varieties must also be disease-resistant. The new varieties vary widely in their resistance to Botrytis, but the varieties Profos and Delta have produced high stands at Stockbridge House in recent trials. Resistance to mildew and tipburn is also important, and the factor for mildew resistance is being deliberately bred into some of the new varieties being raised in this country.

Influence of early sowing and planting

While looking to varieties for earliness, we cannot afford to neglect the cultural factors, other than the use of heat, which lead to this end. Of these, early sowing and planting are perhaps the most important. Planting experiments conducted at Stockbridge House have shown that November-planted lettuce were about three days earlier than those planted in December, but those planted in November or December were at least a week earlier than those planted at the turn of the year.

Early planting has also proved important in reducing losses covered by Botrytis, but this was due to the age of plant rather than the actual planting date. This emphasizes the importance of handling plants while they are still small, with not more than one true leaf fully developed. If lettuce plants cannot be put into their final position at this stage, owing perhaps to soil preparations following the tomato crop, it does at least pay either to bed them out in a frame at 3 or 4 inches apart (a method practised in the south of England) or else transfer the plants to paper tubes, using the JIP3 compost. The least that can be done is to thin out the seedlings in the seedbed so that they do not touch one another. It is clearly important to give the lettuce plants every opportunity to grow without competition with one another during the somewhat adverse conditions which they face throughout the winter.

Spacing

The influence of spacing on earliness may also be important. The evidence in favour of wide spacing is countered by the rapid decrease in yield per unit area as the space provided for individual plants is increased. Nevertheless, growers aiming at putting large lettuce on the earliest markets still favour

spacings as great as 9 in. × 9 in. We have evidence to suggest that 8 in. × 8 in. is adequate, but I think there is a case for re-examining the effect of spacing on early maturity with some of the new varieties now available.

What about watering?

Watering is another important factor in the production of lettuce—less on the time of maturity than its effect on size. Lettuces grown dry are small. And because they are small, their marketable stage is likely to be delayed.

The watering of lettuce is admittedly a controversial subject. At one extreme are those who find watering unnecessary after planting in a soil at field capacity, and at the other those who water liberally even during the harvest period. The retentive capacity of the soil in which the lettuce is being grown must be taken into account here, and perhaps also the ability of the lettuce roots to penetrate to a satisfactory depth. On our light silty soil at Stockbridge House we give liberal watering, certainly without increased losses due to Botrytis, although experimental evidence on the value of such a practice is still to be obtained.

Eye on quality

The early spring lettuce grower of today must accept a challenge which I think can be met by using to their best end the new varieties being made available to him, and employing to the full the cultural advances which have been made in the last ten years. He must see the lettuce crop no longer as the sheet anchor of the Dutch light industry, but as a crop which must be carefully fitted into a rotation with tomatoes to allow him to exploit both crops to his fullest advantage. As with all crops today, the emphasis is on quality.

F. G. Smith, N.D.H., is Director of the Stockbridge House Experimental Horticulture Station at Cawood, near Selby, Yorkshire, where trials with the production of early lettuce have been going on for ten years.

N.A.A.S. QUARTERLY REVIEW

Some of the articles in the Autumn issue now on sale:

Tower Silos and Mechanized Silage Feeding	C. Culpin
Survey of Irrigation Practice, 1961	C. V. Dadd
Internal Parasites of Cattle	T. E. Gibson
Potato Blight Recording by Aerial Photography	G. H. Brenchley and C. V. Dadd
Heat Treatment in the Production of Virus-free Ornamental Plants	M. Hollings

Geoffrey Sykes

R. COLES

GEOFFREY SYKES is known to many as a sharp critic of traditional poultry breeding methods and as one who continually advocates making greater use of professional geneticists. Curiously enough, Sykes himself is a living demonstration of inherited abilities. His unconventional approach, his zeal for the exploration of a new field and his determination to accomplish his aims may appear no very surprising traits when it is realized that his father, Sir Percy Sykes, was a famous explorer and equally determined to do what he wanted. When, at the age of seventeen, Sir Percy was refused permission to go overseas to the Boer War, he just caught the next boat and went. 'It was as simple as that'—to quote a common Sykesian remark.

To many, Geoffrey Sykes may be dismissed—far too easily—as the licensed clown of British agriculture. But the traditional clown is always supposed to hide behind his mask a far more brilliant mind than his laughing audience. And if Sykes clowns, it is sometimes to soften the impact of his trenchant remarks. Perhaps today the number of people who find him merely amusing are rapidly declining for, while he once voiced the right things at the wrong times (for his audiences), the time gap between his prophecies and their manifestation is becoming astonishingly short. How many of his critics smiled pityingly when, in the early 1950s, he forecast a broiler production of 100 million a year? We are now approaching double that number. How many of our established breeders scouted Sykes's demand for a geneticist to be employed by every breeder of standing? Have we not now almost reached that stage?

But before we consider this pioneer of breeding, broilers and 'agribusiness', let us briefly review the earlier years of this man now approaching fifty but still showing the fire and enthusiasm of a very young man.

From Rugby to Harper Adams

Geoffrey Sykes went to Rugby School. We are informed that the latter survived that experience. He then went on to Harper Adams, where he took the agricultural course. Here he began to take an interest in poultry. Admittedly, his interest seems to have been in the main one of carping criticism for, in his own words, he was 'several times slung off the N.I.P.H. premises'. His interest in poultry did not germinate immediately, and the next few years he spent working on general farms as a pupil. But it is noteworthy that during these formative years Sykes was working under Roland Dudley, the pioneer of mechanized farming, and he also came into contact with Webster Cory and his large-scale poultry unit carried on range. At this time, too, Geoffrey Sykes became profoundly interested in the proselytising of the late Sir George Stapledon. He started poultry farming (egg production in folds) in 1937 in partnership with brother Frank.

In retrospect it is perhaps only too easy to trace the pattern of these early influences—mechanization, grassland, poultry—and to discern the source of Sykes's pointed arguments of later years. But the war came, and the next five or six years were marked by hard work on a rented 775-acre farm in Wiltshire, along with several thousand birds on grass and housed in folds.

Disciple of Hagedoorn

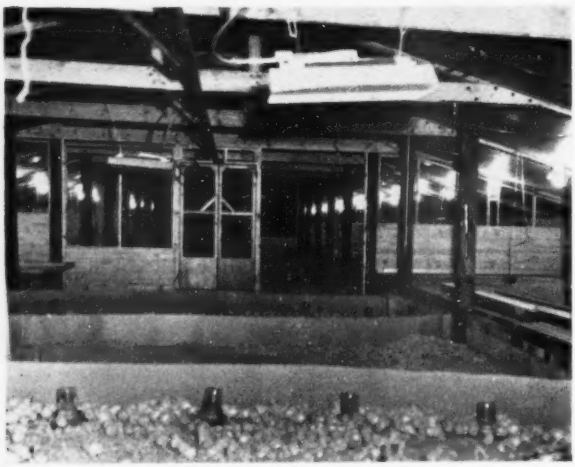
The end of the war saw Geoffrey Sykes becoming inspired by Hagedoorn, and their close friendship began to stimulate Sykes into some forthright opinions on animal breeding in general and poultry breeding in particular. Today, as a disciple of Hagedoorn, he publicly proclaims that our pedigree breeders are expensive anachronisms, increasing to a very great extent the cost of our huge animal breeding industry.

This interest received a tremendous fillip when, in 1946, Sykes was appointed a member of a small group sent to North America to study and report on the poultry industry of that country. Here Sykes found from a few rapidly emerging poultry breeders, including young Henry Wallace, ample evidence to support the opinions of Hagedoorn.

He returned to England and energetically stirred the dovecotes of our traditional breeders in no uncertain fashion. Now began his series of forceful addresses on the need for scientifically based breeding and his pleas for the full use of professional genetics. His poultry colleagues may well have been highly amused at some of his outrageous remarks and pleased at finding some inaccuracies—Sykes always had difficulty over his cyphers! But what pioneer has not been forced to overstate his case if only to persuade his audience to believe part of it? And although some may have seized delightedly upon a slight error of a million or so, they always came along to listen.

Precept into practice

While Sykes at this period may have begun to appear as the professional funny man, the acute brain behind a face of a simple enthusiasm was busy putting his own ideas into practice. At this stage his firm (F. and G. Sykes) began to establish their breeding flock on the lines he advocated; the successes have since provided ample justification of his theories. He initiated the



In this 'controlled environment' laying house, the birds are kept on deep litter from day old to the end of a 14-*months laying cycle*

strawyard house which, in those times of limited supplies of housing material, quickly became popular. And here do we not see his ideas on labour saving beginning to develop? Sykes speedily published a book on his new methods and a few years later published jointly with Hagedoorn a book on poultry breeding, in which the two authors set out their views on modern methods.

Sykes had not forgotten his tour of the U.S.A., then some six years ago, and he admits that at the time his mind was dwelling increasingly on broiler production. In 1952 he obtained a Nuffield Fellowship to revisit the U.S.A. and ostensibly to study developments in deep litter management. In fact Sykes spent his time investigating the progress made in the field of broiler production in the U.S.A. He worked on broiler units with his usual enthusiasm and determination to find out as much as possible.

At the end of his visit he returned to England and crusaded for broiler production with his usual—or unusual—gift for overstatement. The following story is typical of this trait. Sometime during the War Geoffrey found time during his varied tasks to get married. His wife Beatrice is charming, a little reserved, she avoids Geoffrey's limelight but runs the cattle section of the farm with extreme competency. She has also an acute mind and a dry wit. When asked at a Conference what Geoffrey would be speaking about, she replied: 'He will talk sense for three minutes and will then levitate himself!'

This is a fair comment on Sykes's style at public meetings, and it is an approach that demonstrates the acuity of his mind. The 'three minutes sense' establishes in the minds of his forward-thinking listeners the soundness of his proposition. The 'levitation' act may stimulate in them vaulting ideas over future development and possibilities. To others the fantastic future may be an occasion for a glorious laugh. But that three minutes sense persists in the mind like a mustard seed.

Enthusiasm for broilers

Sykes's broiler promotion policy continued for the next eight years. By a stroke of fortune, his enthusiasm for broiler production began shortly before the ending of the rationing of animal feedingstuffs. His campaign seems to have found firm support in a number of younger men imbued with a wish to do something new—no doubt the restrictions of the war and the

immediate post-war years in agriculture had led to a feeling of frustration among these younger, probably restless and energetic go-ahead young men. The mustard seed of 'three minutes sense' began to flourish speedily. In 1952 one can fairly say that there was no broiler business in Britain. By 1953 the production has been estimated at five million. Sykes's prophecies of a hundred million a year within a few years were received with open derision by many. Yet his target figure was achieved in 1959–60 and output is now approaching double that number.

At this period one could sense a change of attitude towards Geoffrey Sykes. True he could still be relied upon to provide tremendous amusement. But the time-lag between his forecasts and their actual achievement was becoming shorter and shorter. He was laughed at but listened to.

He spent considerable time promoting broiler production in all its aspects. He was a leading figure in the setting up of Western Chicken—one of the first large, integrated breeder-flock, hatchery, broiler farm and processing broiler factories. His particular style of public speaking had the advantage of putting across unpalatable facts in a manner which did not utterly depress his audiences. But Sykes had now seen the broiler business he had urged so strongly fully launched and, having achieved that aim, his interests had already begun to move towards fresh fields.

Agribusiness—a recurrent theme

In one of his annual visits to the United States his inquiring mind was stimulated to look into the Harvard Business School's 'Concept of Agribusiness'. Sykes is a farmer and his first interest is with the primary producer. He was struck by the fact that in the U.S.A. technological improvements in food production had steadily reduced that relative proportion of the income from food sold which the primary producer received. The Harvard School taught him that the men who would find it profitable to stay in agriculture in the future would be farmer-businessmen who had ensured high efficiency in supply, processing and merchandizing. (In the U.S.A. 87 per cent of 'agribusiness' is an off-the-farm operation.) This concept implies an interest by the primary producer in all stages of the production-processing-selling chain.

A modern, fully-insulated, broiler house for 15,000 *birds, with automatic feeding and watering appliances*

The view is held by Sykes that this form of integration will speedily lead to the processing and retail sections of the food trade strengthening their position, and ultimately those who develop the best business and financial management will be in a position to dictate their terms to primary producers. For the last two years 'agribusiness' has been the theme of Sykes's talks.

Undoubtedly the idea has taken root. The integrated group in the broiler business is now the rule rather than the exception and integrated groups are rapidly spreading among commercial egg producers, turkey producers and also with pigs and beef cattle. The last year or so has also seen a link-up between producing and retail organizations.

Sykes has somehow found time to put his views and ideas on 'agribusiness' into print and a new book of his, *Poultry—a Modern Agribusiness*, is being published this autumn. He has also been employing some of his inexhaustible energy in giving a Sykesian slant to the egg producing business. Apparently he believes it is time that section of the poultry industry received some attention and, with some associates, he has been in Herefordshire developing an entirely new approach to commercial egg production.

Prophet in our midst

With his customary interest in the future, Sykes sees certain innovations coming in a decade or so which many treat with the complete scepticism accorded to his earlier forecasts. Sykes believes that highly scientific breeding will develop with all farm livestock. He is of the opinion that, within the next twenty years, twelve companies will control 80 per cent of the basic business of all livestock breeding of the Western World. He claims that, within the same space of time, fifty companies will control 50 per cent of the animal industry 'agribusiness' of Europe. He does not rate the number of British firms among these two groups as high; unless, he says, the British wake up to the opportunity of their age, the U.S.A. will have the preponderant influence. He sees in the Common Market a proliferation of tremendous horizontally integrated companies in 'agribusiness'.

These ideas are naturally unpalatable to the majority; they are dismissed as fantastic. But Sykes has shown himself to be a true prophet in the past. Those who deride these latest views of Sykes in public must nurse very grave anxieties in their hearts in private.

It is given to few men to see the fruits of their pioneering efforts in their own lifetime. But, as a pioneer in the world of breeding, broilers and 'agribusiness', Sykes can look upon real evidence around him that his ideas have indeed taken root and flourished. It is typical of the man that he offers his views and ideas without thought of personal gain. It is a characteristic of him and other pioneers that, once their ideas are accepted, their interests turn to other fields. Geoffrey Sykes must sometimes be comforted by the fact that Beatrice keeps that guiding hand on the cows while 'levitation' is in full operation.

Dr. R. Coles, M.Sc.(Agric.), M.Sc. (Econ.), B.A., Ph.D., D.Sc., is the Ministry's Chief Poultry Advisory Officer. He is a Past President of the World Poultry Science Association, and he accompanied Geoffrey Sykes on the study tour of U.S.A. and Canada in 1946 which is mentioned in the article.

Rabbits and Pigeons

Graham Richmond

FARMERS aren't in business to feed rabbits and wood pigeons, and for that reason we in the Ringstead district, a few miles fron King's Lynn, are determined to keep their numbers down to negligible proportions. We are only a small Society, formed in March, 1960, with an area of 15,000 acres, and our warrener began operating in April of that year. Some Societies, of course, are very much larger.

During our first year, we enrolled 22 members, each holding one £1 share in the Society, in addition to which they paid a contribution of 1*s.* 3*d.* per acre, a total of £484. Membership is now thirty strong, bringing our paid-up acreage to 9,278 acres. But whilst this formative period has been a successful one, we shall not be satisfied until we have complete coverage of our 15,000 acres; for anything we can do to bring in our neighbours will not only mean we can give a better service, but also a cheaper one for all.

It may well be that, with the presence of myxomatosis, the rabbit population is being kept at a constant level; and it is unfortunate and perhaps discouraging

Hide for shooting pigeons, made from a pig creep

that much of the good work carried out by a warrener cannot be shown in figures. It must be accepted, however, that where badly affected areas have been treated with Cymag the results have been highly satisfactory.

There is much more that a successful Society can do besides holding down rabbits. In our area, the wood pigeon is fast becoming the major pest, and we have been carrying out the work of nest-destruction since the Society's formation. At the end of 1961 we had destroyed 2,669 nests, 1,704 eggs, and 1,794 young pigeons.

We intend to intensify our efforts this year, and our warrener got busy in the last week of July and will carry out his next attack in the second week of September. These are the times when the best results, in terms of man-hours spent in nest destruction, can be obtained. A systematic attack of nests twice or, better still, three times at six-weekly intervals during that period is likely to account for a high proportion of young birds.

A very important service performed by a Rabbit Clearance Society for its members is to operate the Ministry's grant for cartridges used for shooting wood pigeons and other harmful birds. The grant is paid on cartridges used by persons who are engaged by a Society as recognized shots, provided they are recorded as recognized shots in the Minutes of the Society and in a register kept by the Divisional Executive Officer.

In accordance with these conditions, our Society has made the following allocation of cartridges to members:

1. Two cartridges per acre of paid-up acreage *@* 3*d.* each.
2. Additional cartridges, also at 3*d.* each, provided that returns on (1) sent in to the Secretary show a 'kill' of 1 per 3 cartridges used. The maximum allocation is limited to 5 per acre.

We have had several shooting days throughout the county when this service was put to almost full use. Where every possible gun was not out, at least our members saw to it that the birds were kept on the move, which is an essential part of the drill.

In the national campaign against rabbits and wood pigeons it is essential to have no black spots. Members themselves can do much to help their Committees by personally recruiting new members and by combating the attitude 'It's not my problem'. It *is* the problem—and the responsibility—of everyone who farms the land.

Graham Richmond has been Secretary of the Ringstead and District Rabbit Clearance Society since its inception 2½ years ago.

V. Liversage describes

The Small Farms of Northern Ireland

There are 72,000 holdings in N. Ireland, most of them less than 100 acres, held under an unusual form of land tenure

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ACCORDING to the statistics there are 72,000 agricultural holdings in Northern Ireland, of which only 4,000 are over 100 acres. Some of them would scarcely be called 'farms' in the ordinary sense; a system of small properties lends itself to a wide variety of expedients such as retirement, part-time and subsistence farming. Some owners do practically no farming, and there are only about 50,000 effective farmers.

The Normans attempted to feudalize the old Celtic tenures, and the decay of the feudal system, coupled with the various 'plantations', led to a landlord-and-tenant system. The rural population never became reconciled to this situation, and in the early part of the present century the landlords were bought out and the land settled on the sitting tenants in return for terminable annuities. Thus the state of things at the period of the transfers set the pattern of farm size and layout.

Letting of farms in conacre

For many years a holding subject to the annuities could not be let for longer than 11 months at a time. This has helped to perpetuate a long-standing system of letting *in conacre*—that is, field by field for the ensuing season for specified uses. Auctions are held during the winter, and something like one-sixth of the land is let in this way each year.

Sometimes the system may lead to impoverishment of the land, but in other respects it plays a useful part. It facilitates conservation of capital and economy of labour by making greater specialization possible. Thus a farmer with limited labour or capital resources may let the root-break for potatoes, or the corn-break for oats or barley on condition that the taker undersows the corn with grass seed provided. On the other hand, a man with sons of working age may take additional land to avoid under-employment. A widow may let the land until the sons are able to take control, and a person with some private means may enjoy the amenities of the country without the effort of working the land.

Sometimes *conacre* rents are quite high—as much as £60 per acre for potato land has been reported in one favoured district—but much depends

on the social conditions in the locality as well as on the nature of the land.

Family labour is the mainstay of Ulster farming. There are only about 7,000 full-time male workers and about as many casuals.

Milk production—the sheet anchor

The pattern of farming is so diverse that it makes generalization difficult. Natural conditions dictate wide differences in the system of farming. There are considerable areas of hilly and marginal land where store stock-raising and sheep husbandry would be the natural enterprise, but generally there is some attempt at milk production. At the other extreme there are the early lands south of Belfast, where early potatoes are followed by broccoli, in rotation with general farm crops and livestock husbandry. In Armagh, Bramley apples are combined with general farming. On many farms certified seed potatoes provide the means of intensification so necessary on a small farm.

Milk production is the sheet anchor of Ulster farming, and often it is the sole enterprise of any account. A milking herd of 15–20 cows with followers on 40–60 acres, worked entirely by the family, with a tractor of recent vintage, a manure loader and spreader and a set of haymaking or silage machinery is a typical set-up. Naturally, the merchant's lorry is relied upon for practically all the concentrated food.

Poultry and pigs

Egg production is naturally an important enterprise. There are not many large flocks, the general run being 150–500 hens where the poultry are kept as a commercial enterprise and up to 100 where they are the wife's perquisite. Deep litter is the most common system, though there are still a lot of small flocks to be seen outdoors. A number of farmers have been tempted into the broiler business and, of course, they are experiencing the same difficulties as their competitors in England.

Pig numbers have been going up quickly. Very small farmers keep two to four sows and sell the progeny as small stores. On the larger holdings there are often substantial herds, either breeding and fattening or units where stores are bought through dealers for fattening. As there is no substantial pork market, attention is perforce directed to the Wiltshire side trade. The Pigs Marketing Board relieves the farmer of responsibility for transport and marketing.

Beef an adjunct

There is a fair amount of beef production, including the finishing of stores imported from Eire. In general, however, cattle fattening does not offer a high enough turnover for the small farm and, except on the largest holdings, it is an adjunct to some more intensive enterprise. A dairy farmer may run on a few steer calves, or beef cattle may be kept to utilize rotational grass where the main preoccupation is with potatoes or barley. On many small holdings or holdings occupied by elderly people, where the main enterprise is poultry or pigs or where the holding is mainly residential, a few beef cattle may be kept—more to keep the land in order than for the sake of the return expected.

Though most farms are more or less mixed, there is a steady trend towards a greater degree of specialization. One illustration of the trend is the steep decline in the oat crop for home use. Its place is being taken by barley grown

Typical N. Ireland farm, with small fields and mixed crops

by specialist growers equipped with combines, driers and balers. Another form of specialization is the increasing use of contract work for harvesting and other operations.

The progressives

By and large, Ulster farming is probably pedestrian enough, but there are many progressive and even original examples. A well-known case is O'Neill of Lurgan, the exponent of milk production without concentrates. There is the practice of high-humidity pig housing associated with the name of Jordan. Some farms have pig fattening units with annual throughputs running into thousands, the manure conducted along underground channels into sludge pits from which it is applied to grassland by vacuum distributors. Large pig-breeding units, combined with barley growing and home milling, are of course peculiar to the larger farms. Pigs are an obvious means of increasing the turnover from a limited acreage, and recently I came across one farm where a net profit of over £3,000 was being made on 30 acres, with 12 cows, 25 sows and a few hundred poultry. Another farmer on 30 acres was carrying 15 fattening sheep to the acre on leys fertilized with pig sludge. One milk producer, by cutting out young stock and maintaining the herd by purchase and using bought concentrates generously, raised his gross profit per acre to £80, with very economical overheads.

Not much demand for credit

It does not appear that availability of credit is felt as a serious problem, perhaps because most farmers are content to build up enterprises from within. The agricultural industry is sitting on a large negotiable security in the shape of land values, but it would seem that most titles are unencumbered and there has been no demand for an agricultural mortgage corporation. The Government offers a wide range of credit facilities, but in proportion to the size of the

industry little use has been made of them. Bank overdrafts, hire purchase and trade credit, however, are in some demand. Unlike the situation in most countries of small occupying ownership, there is no suggestion that debt is looked upon as an occupational hazard.

Small farm economically considered

It is often assumed that the small farm is relatively inefficient, but everything depends on the criteria used. In some respects the comparison is the other way. Thus, if on the basis of the official farm income figures for 1959–60 the 30–50-acre farms of Northern Ireland are compared with a group of mixed dairy farms in England and Wales (averaging 225 acres), the small farms show a 66 per cent greater gross output per acre. When the cost of purchased supplies and services, including unpaid family help, is allowed for (ignoring rent), the net sum remaining is over 100 per cent greater. The small farms use much less hired labour and family help than the large. Product for product, they receive the same subsidy; thus the essence of the charge against the small farmer is really that he sells his own labour and managerial ability too cheaply.

Apart from the relatively small size of the farms, the Ulster farmer labours under some handicaps as compared with his counterpart in England. Some four-fifths of the produce must be exported. Under present guarantee arrangements beef cattle and sheep realize much lower prices because of the cost and difficulty of live shipment. Much thought is being given to the question of local slaughter and shipment in carcass form, but there are formidable difficulties arising from the seasonal nature of production. As previously remarked, there is no considerable market for pork pigs, nor for heavy hogs. Ware potatoes cannot be sold in any quantity in England until the local crop runs short. A new black cloud on the horizon is the rise of large commercial egg farms in England, offering a quick farm-to-shop service. This could not be matched by Ulster producers.

Comfortable standard of life

So far, however, the countryside is far from wearing the hue of a depressed area. Properties are, in general, well maintained. The older houses are steadily being remodelled, no doubt with an increase in comfort and convenience if not always in artistic appeal. A considerable amount of alteration and extension to farm buildings is going on, particularly in the form of silos and covered cattle yards. Over one-third of the farms are now connected to mains electricity and one-seventh to public water supplies.

As in other countries, machines have taken much of the backache out of farm work. There is active support for local social activities such as church functions, drama groups, women's institutes and the like. Links between town and country are strong, as is natural when so many farmers' sons have made their way in industry, the services and the professions. It is of course possible to find farm families living under rather squalid conditions, but generally speaking the standard of life is comfortable if unostentatious, and not without its attractions in an increasingly restless world.

Mr. V. Liversage, B.Sc., M.S., N.D.A., is himself now a small farmer in Ulster. He was formerly Chief Agricultural Economist in the Ministry of Agriculture, Northern Ireland, and Senior Lecturer in Agricultural Economics at Queen's University, Belfast.

Combe Martin

A Study of Horticultural Isolation

P. Allington

Combe Martin lies between Ilfracombe and Lynton on the edge of Exmoor. Some of the earliest gardens near the sea

COMBE MARTIN is remote from any populous industrial centre. It is therefore strange at first sight why market gardening, especially the production of early strawberries, should form the basis of the economy of the two-mile valley.

From silver to strawberries

Up to the nineteenth century the silver mines gave full employment to the small local population. When they were closed many miners and those associated with mining turned to market gardening on the south-facing allotments and fields. These allotments, together with the smallholdings and tradesmen's gardens, developed into the market garden area as we know it today. It extends for two miles inland and, on an average, four hundred yards up the south-facing valley sides.

At the same time that the mines were being closed, Ilfracombe was gaining popularity as a holiday resort for the rich. And as Ilfracombe prospered, so

the demand for fresh produce grew. It was fortunate for the valley that it could meet this need. Early strawberries were successful, but soon the local demand for them was exhausted and South Wales was looked to as the major market. Baskets of strawberries, weighing 12–25 lb, were carried as deck cargo by steam-packets from Ilfracombe to South Wales, for fourpence each. This trade lasted right up to the Second World War; and towards the end of the thirties consignments were going by rail to the Midlands.

In Victorian times a small strawberry, probably very like the wild strawberry, was grown. The old growers remember them affectionately as 'Pinkies'. Between the two world wars the majority of strawberries grown were Joseph Paxton and Royal Sovereign, and in the 1930s the variety Madame Lefebvre came to the fore because of its earliness and heavy yields. Even today 'Phoebe', to give its local name, is still the main early variety, though almost every new introduction since the last war has been tried. Of the maincrop varieties, Cambridge Favourite and Redgauntlet are most widely grown, and Rearguard is the most popular late variety. Talisman is also grown, but on a smaller scale.

At the turn of the century a man and his family were content with a living from a market garden of one acre. Such men bought their holdings when Buzzacott Manor was broken up and put on the market in 1919. They paid between £300 and £500 an acre, often bidding against themselves in a blind panic that they might lose their holdings! Such prices are still asked today, but they are paid only when the land can be used as a building plot. Where an acre kept a family sixty years ago, now only 4-acre holdings and larger seem to be holding their own; smaller holdings are being worked part-time or allowed to go derelict.

Now general market gardening

The situation today is very much what it has been for the past twenty years. The size of holding is still small, the majority being between 2 and 4 acres, with very few of 6 or 7 acres. Each holding is divided into small fields by earth banks, typical of Devon. These fields are usually about an acre, although some are no more than a quarter of an acre, and few fields are larger than 2 acres. Planned in the days of hand labour, these fields are most difficult to work by mechanical means. So manual work such as hand forking has been kept for most of the operations.

Strawberries are still the most important single crop but the accent which used to be on specialized production has now shifted towards general market gardening supplying local North Devon needs, as it did in the nineteenth century. The only really specialized early strawberry holdings are now limited to the sunniest slopes at the sea end of the valley. The rest of the holdings are more general in nature, growing maincrop and late strawberries, early potatoes, hearted spring cabbage and other brassicas, anemones and various perennial flowers. These latter holdings derive the bulk of their income from local trade, sending some of their strawberries and anemones further afield. The specialist holdings, fast disappearing, rely on Midland and South Wales markets to sell their produce. The division of holdings is not a sharp one, being rather a transition from one end of the valley to the other.

There is no rigid rotation of the important crops grown, although early potatoes often precede anemones or strawberries, and brassicas usually follow

Hand forking on a typical Combe Martin slope

strawberries. As the type of production is becoming less intensive, so the crop rotations are becoming less tight in schedule, with periods of fallowing between some crops.

In the past, the preparation of land for strawberries entailed the liberal use of farmyard manure and locally quarried lime. Today bulky organic manure is scarce. Base dressings of a high potash compound fertilizer are now used, with top dressings of a similar compound each spring. In dry seasons, crops lacking in humus suffer much more than those crops on well-dunged land. Strawberry planting takes place as and when the ground is available from August to November. Some planting is even delayed until the following spring. The runners are usually taken from fruiting beds, very often being sold 'over the hedge'. Latterly, more interest is being shown in Ministry certificated plants.

The earliest planted runners are fruited in the first (maiden) year, otherwise no fruit is picked that season. Plant spacings range from 1 ft × 2 ft on the steeper slopes to 1 ft 3 in. × 2 ft 6 in. on the deeper soils at the bottom of the slopes.

Each winter the strawberry plots are 'shallow turned', using a long-handled fork. Although this operation is laborious, it does ensure a clean start the next season, as all the weed growth is buried. Very little strawing down is practised, due to the high price of straw and the fact that the shale soil reduces mud splashing considerably. The crops are retained as long as the grower thinks they will be fruitful the following season. This means that the majority of beds are grubbed out after the fourth season, but occasionally much older beds are to be found.

Spring cabbage is transplanted in September at 1 ft × 2 ft spacing. No base fertilizer dressing is given, but a nitrogenous top dressing of 5 cwt per acre sulphate of ammonia or Nitro-Chalk is applied in February. The type grown is Wheelers Imperial, which is cut as a mature cabbage. Neither spring

cabbage nor early potatoes are popular, because of the heavy weight and bulk which has to be manhandled from the small fields. The early potato crop is hand lifted.

Anemones are a valuable source of income in the winter months. Corms of 2–3 cm are planted in 1 ft 3 in. rows, with two corms every 4–6 inches. Thus up to 200,000 corms are planted per acre. Base dressings of compound organic fertilizers are often applied which, with the high corm density, gives a very leafy crop with long-stemmed flowers of medium quality. The crop is picked over once a week, except when growth is halted by freezing conditions as in the winters of 1947 and 1961–62. Virtually all this crop is marketed in the midland and northern markets.

Very few growers have come into Combe Martin from other districts, and they have all tended to use traditional Combe Martin practice rather than introduce new ideas—a reflection perhaps on the isolation of the valley. An average of ten men are leaving full-time horticulture in the valley each year, but few holdings are being sold; rather they are being cultivated less intensively, as a second source of income to the owners.

Uncertain future

Retired people are bringing in capital which, together with the holiday industry, is holding steady the prosperity of Combe Martin, despite the decreasing profitability of market gardening. If horticulture in Combe Martin continues to contract at the present rate it may have disappeared in ten years time, except for those growers who will always be necessary to supply local needs of fresh fruit and vegetables. It should always be remembered that North Devon's isolation is as much a hindrance to importers as to exporters in the district; and because of this, small producers supplying local demands will find markets for their produce long after similar-sized holdings have disappeared from around the large cities.

A prosperous market gardening community could exist in Combe Martin for many years if larger units of buying, production and marketing were formed. They could take advantage of more mechanization, at the same time growing only those crops which can compete on the open market with produce from other areas. But there is little evidence of such developments at present, and the future of horticulture in Combe Martin is one of great uncertainty.

P. Allington, B.Sc. (Hort.), is a N.A.A.S. Horticultural Advisory Officer in Devon.

The idea of it

WHERE time and economics are of first consideration, farmers, by sheer necessity, have on many occasions to perform functions better suited to skilled mechanics and other artisans. This ability to turn his hand to jobs demanding more than a rudimentary knowledge gives a farmer the unique opportunity of exploiting his skill.

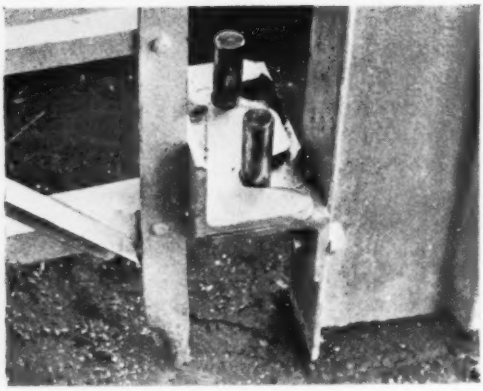
By his practical experience he can often envisage certain improvements to, or adaptations of, an existing implement or machine. Many carry this a stage further, to a practical end. It certainly would not be wrong to say that some of the best ideas incorporated in present-day agricultural machinery have been evolved on the farm.

It is a rare occurrence, however, to find grouped at one agricultural show a collection of implements and devices all invented by farmers and others in the industry, and displayed for the good of all.

At the Royal Ulster Show, Belfast, this year a local firm (E. T. Green Ltd.) displayed some of the proved ideas of farmers, most of them from Northern Ireland. Twelve exhibits were shown, and the features of many were their simplicity and time-saving factors.

Certainly this was so in the case of the *combined pitch-fork and baler twine cutter*. This implement consists of a pitch-fork with a short-curved blade welded to one of the prongs, so avoiding the need to carry a knife when feeding and bedding cattle.

The principal advantages claimed for a *mobile cattle grid* invented by



Mr. Ian Fleming of the Work Study Unit, Scottish Agricultural Industries, Ltd. include complete freedom of access for vehicles, its very quick installation and its complete portability.

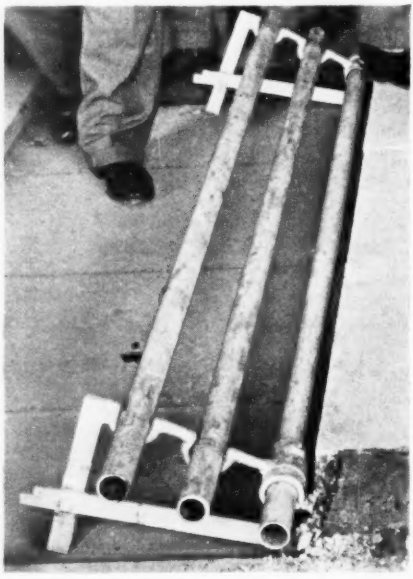
It makes a safe barrier to stock, fits any opening and no time is wasted in opening and closing gates.

A *two-way gate* is a very useful idea, and one exhibit on show was a two-pin device implementing this process. There are many occasions when a gate must swing *up* the hill, and this neat idea does away with the need to remove soil in order to allow the gate to swing.

A gadget for *preventing cows from standing in the gripe* was invented by Mr. James Adams, Killyree, Clough, Ballymena.

Simplicity, again, is the feature of this foolproof and useful invention. It consists of special brackets on which are placed two lengths of galvanized piping. A third pipe at the base is inserted through the brackets.

The device does not interfere with cleaning out the byre.



Wm. Millar

Planning in Horticulture

Not chance, but managerial ability is the basis of a profitable holding

E. B. Fekete

THE popular belief in horticulture seems to be that the industry is mainly governed by chance factors and consequently whatever planning is done is of no or very little practical value.

About thirteen years ago, at the beginning of our studies of horticultural economics, some very wide variations in the financial results of holdings seemed to suggest that risk and uncertainty were the main characteristics in horticultural production. But as the years have gone by, we now know that a good many of these variations have been due to managerial rather than chance factors. Changes in the crop rotation, in the variety of crops, or even in the method of growing them were seen to have a considerable bearing on the annual returns. Moreover, changes in the labour force, or in the standard of mechanization, have their effects on the profitability of the business. These and many other similar factors have nothing to do with weather, imports or over-production, and their effects can hardly be ascribed to the hazard of chance. They are purely managerial factors which require some careful consideration when plans for production are being made.

Merits of planning

In business, success depends very largely on the degree of efficiency with which operations and transactions are carried out. To achieve and maintain a reasonable degree of efficiency on a holding, it is indispensable to have a production plan from which the grower can see in terms of money what he is striving for, and something against which he can measure his success at the end of the year. In this way, he can spot the weaknesses in his management and find the remedies. Without a plan the business seems to be run blindly with no financial objective. The soundness of decisions on crops, on their scale of production, the technical methods and costs involved can be judged properly only from a detailed plan showing in cash how the various enterprises contribute to the overall output, how much will be absorbed therefrom by costs and, most of all, whether the margin of profit will confirm the worthwhileness of the plan.

Technique of planning

The system of horticultural business analyses and the procedure of planning follows very closely the technique which has been evolved for farming. The analysis of past accounts by which the total revenue and expenditure are dissected shows clearly the returns of single crops and costs per unit of land, glass, etc. This study of the existing relationship between output and input forms the basis of planning and of the procedure of reassembling the business in a more profitable manner.

Drawing up the production plan can be based either on the gross output or gross margin of crops. The first method has been in operation for a number of years, but the second is a recent development which may simplify the approach. In any case, both methods should provide the same answer to the problem.

As the volume of production depends on the system of cropping, the first step in planning is to settle on the rotational pattern for each field of land and unit of glass. Only in this way can one avoid errors of including crops for which no land or no labour will be available.

Gross output method

Having decided on the kind of crops and their acreage distribution, the pattern of cropping can be expressed in terms of cash by using standard returns. The total of these returns will show the anticipated gross output of the holding. If this volume of output is not sufficient to carry the costs involved and to return a fair margin of profit, then an alteration in the acreage distribution, or substitution of crops will be necessary to arrive at a more favourable balance. With regard to costs, the estimates can be worked out according to a percentage distribution related to the total output. The aim is to allocate the costs in such a way that they will satisfy the requirements and leave a margin of about 15–20 per cent of the output for profit. The results thus obtained will be the targets to serve as a guide in the conduct of the business.

	Acres	*Gross output per acre*	*Total*		*Percentage of revenue*	
		£	£			£
Sprouts	9 *a*	168 ..	1,512	Labour, incl. grower's own labour	40	2,746
Spring cabbage	4	180 ..	720	Seeds, fertilizers	10	687
Beetroot	¾	241 ..	181	Machinery, incl. depreciation, fuel, repairs	11	755
Spring onions	1½	788 ..	1,182	Miscellaneous	18	1,236
Runner beans	2½	261 ..	652	Rent	1	69
Peas	3	146 ..	438			
Lettuce	2	360 ..	720			
Leeks	2½	373 ..	932			
Radish	1	529 ..	529			
TOTAL			6,865	TOTAL	80	5,493

MARGIN £1,373

In preparing these estimates perhaps the main difficulty is to find suitable standard values for the calculations. However, a good many crop returns

have already been worked out by the N.A.A.S. and the universities, but they can also easily be assessed by the grower himself. On cost distribution, either the accounts of a reasonable year of the holding in question, or the data obtained from a similar holding can serve as a guide. The mechanism of this method can be seen from the figures on p. 286 of a 25½–acre holding.

Gross margin method

This approach is still in its experimental stage in horticulture. The essence of the method is to base the cropping policy decisions on the profitability of the crops in question. This measure of comparative advantage is called 'the gross margin', being the difference between the output and the variable costs involved in growing the crop. The costs which vary in direct proportion to production (labour, seed, fertilizers, glasshouse fuel, etc.) are the 'variable' costs; those which have to be met regardless of kind and volume of production are the 'fixed' costs (rent, depreciation, interest, etc.). When considering future cropping the fixed costs can be overlooked temporarily, since what really matters is to find those crops which can be grown most profitably.

The technique of preparing gross margin figures is a matter of a simple calculation. By following the process of growing the crop, one can easily estimate the cost of required materials, labour and power. The difference between the net receipts and the total variable costs will represent the gross margin of the crop which can be expressed as £ per unit of land, glass, etc. The total of these results related to the intended acreages of crops will give the gross margin of the holding as a whole. After deducting the fixed costs from this amount, the result obtained will be the anticipated net margin. On the 25½-acre holding quoted above this calculation would work out as follows:

	Acres	*Gross margin per acre*	*Total*	*Fixed costs*	
		£	£		£
Sprouts	9 *a*	58	522	Rent	178
Spring cabbage	4	66	264	Rates	42
Beetroot	¾	70	52	Depreciation	433
Spring onions	1½	301	451	General repairs	31
Runner beans	2½	44	110	Vehicle tax, insurance	63
Peas	3	38	114	Other insurances	19
Lettuce	2	191	382	Sundry costs	113
Leeks	2½	159	397	Allowance for overhead labour	
Radish	1	341	341	15% of total labour cost (£2,746)	412
TOTAL			2,633	TOTAL	1,291
Less					
Fixed costs			1,291		
MARGIN			1,342		

Thus the above result is very similar to that of the previous calculation. As gross margin figures account only for the actual labour cost of growing, an allowance had to be made for covering the cost of the overhead labour. In horticulture, it is perhaps more difficult to determine the fixed costs than in farming. For instance, permanent labour could be treated as fixed cost; but regular labour is often employed on work which in theory might be done by casuals, or there may be jobs generally carried out by regular labour which might be done by contract.

Checking results

At Bristol, for the purpose of following up the budget, we provide the grower with two forms: one prepared for revenue and one for expenditure, each showing the targets in detail. The forms are sub-divided into months according to when the grower's financial year begins. On the revenue form the returns for each crop have to be recorded month by month. Each month the return is added to the sum of the previous month so that the grower can see what progress he is making towards the target for that crop.

With regard to expenditure, the amount spent is written down each month. In the first month it is subtracted from the target figure and afterwards from the balance left at the end of the previous month. In this manner, the grower can see each month how much is still left from the estimates to spend on the various items.

The aim of keeping these simple records is to enable the grower to follow up his budget and to make timely corrections, if necessary, either by cutting down expenditure or by introducing additional cropping.

The author, **Dr. Erwin B. Fekete,** is a Doctor of Laws (Budapest). He studied Economcis at the University of Bristol, and is, at present, Agricultural Economist there.

Farm Rents

MORE FIGURES FROM LAST YEAR'S A.L.S. SURVEY

LAST month's article, *New Light on Farm Estates*, described how a rent survey was made in the autumn of 1961, covering 1,786 estates and nearly 3 million acres of farmland in England and Wales. The article also showed how these estates varied in size and in the number of farms on them.

The present article is concerned with the rent levels current at the time of the survey and compares them with those of the previous year.

National average rent level

The average rent per acre of crops, grass, and rough grazings on the sample of farms in England and Wales at mid-October, 1961, was £2 12*s*., an increase of 11½ per cent over the 1960 average of £2 7*s*. These figures compare with an average rent of £1 19*s*. per acre in 1957 and with £1 7*s*. per acre at the time of the National Farm Survey (1941–43). Like most averages, the figures

conceal a great deal of variation. Within counties, there is a variation between farms, depending on the quality of the land and buildings and on whether they have recently been let by tender or have not had a rent review for several years. Between counties, the variation largely reflects the quality of the land and in particular the extent of hill land and other rough grazings. Where this is greatest, as in parts of Wales and Northern England, average rents will tend to be lowest.

Regional rent levels

Table 1 on p. 290 shows the average rents by regions. The Eastern and West

Average County Rent Levels

Note: These are county averages. There will not normally be the abrupt changes in rent levels at county boundaries that the map tends to suggest.

Midland regions command the highest average rents and the Northern region and Wales the lowest.

TABLE 1

Rents per acre by regions

Ministry of Agriculture Region	*Oct. 1960*	*Oct. 1961*
	£ *s.*	£ *s.*
Eastern	3 8	3 15
South Eastern	2 10	2 17
East Midland	2 8	2 14
West Midland	3 0	3 8
South Western	2 13	2 19
Northern	1 7	1 9
Yorks and Lancs	2 6	2 11
Total England	2 10	2 15
Total Wales	1 8	1 11
Total England and Wales	2 7	2 12

These differences are more clearly illustrated in the map on page 289. The average rental rises to over £4 per acre in the Fens and Cheshire, but in the upland counties in the north and west they fall below £2 per acre.

Rents by estate size

Table 2 shows that the bigger the estate the lower is the average rent per acre. This is partly explained by the fact that the larger farms (which tend to have lower rents per acre) are more common on the larger estates. On the other hand, the average rent level on the 'estates' consisting of a single rented farm was above average, despite the fact that these farms were relatively large ones.

TABLE 2

Rents per acre by size of estate

	Oct. 1960	*Oct. 1961*
	£ *s.*	£ *s.*
Estates of one farm	2 13	3 2
Estates with more than one farm:		
0—1,000 acres	3 0	3 6
1,001—2,000 ,,	2 12	2 18
2,001—4,000 ,,	2 9	2 15
4,001—6,000 ,,	2 9	2 15
6,001—10,000 ,,	2 7	2 12
Over 10,000 ,,	1 16	1 19

Change in rent between 1960 and 1961

The increase in rents between October, 1960, and October, 1961, of 11½ per cent mentioned earlier, is the average for all estates and covers both increases in rents to sitting tenants and increases in rents on change of tenancy. In the course of the survey, information was collected to show the relative importance of these two types of increase.

There was an increase in rent on 33 out of every 100 farms included in the survey. Of these, 29 were sitting tenants with a rent increase averaging 30 per cent. Rent increases on a change of tenancy were of course considerably less frequent, occurring on the other four farms in every hundred, but in these cases, as would be expected, the increase in rent was considerably higher, and averaged 65 per cent.

Agricultural Chemicals Approval Scheme

Additions to the 1962 List of Approved Products

THE following additional products have been approved under the Agricultural Chemicals Approval Scheme. The second List of Approved Products was published on 1st February, 1962.

HERBICIDES

CHLORPROPHAM with DIURON

A residual herbicide mixture for the control of a wide range of germinating annual weeds in spring-sown crops of peas, broad beans and tick beans.

Liquid Formulations

New Residuren—Farm Protection Ltd.

2,4-DB, with 2,4-D

A mixture of translocated herbicides for the control of bindweeds, knotgrass, redshank and other weeds in direct-sown white clovers and grasses and those undersown in winter cereals, spring wheat or spring barley.

Liquid Formulations

Dioxone—Plant Protection Ltd.

DINOSEB (DNBP)—*Formulations in Oil*

Dino—Profarma Ltd.

Kiloseb Haulm Killer—Metallurgical Chemists Ltd.

Morto Potato Haulm Destroyer—Murphy Chemical Co. Ltd.

Stemmex D—Pan Britannica Industries Ltd.

SEED DRESSINGS

ORGANO-MERCURY LIQUID

Liquid Leytosan—F. W. Berk and Co. Ltd.

53. Salisbury, Wilts

D. E. Y. Morris

THE cathedral spire dominates the Salisbury district. It can be seen from afar, standing proudly in the valley in which the city lies.

Salisbury is built on the banks of four rivers, which join to form the Avon, flowing into the sea at Christchurch. These rivers, the Bourne, Avon, Wylye and Nadder, are joined by a fifth river, the Ebble, about a mile to the south of the city. They all rise in the chalk downs and flow through winding valleys which give the district much of its character.

Salisbury is about 150 feet above sea level in the centre of the district. The area embraced extends to the Hampshire border in the east and south, to the War Department training area in the north, and some ten miles west to the picturesque villages of Ebbesbourne Wake, Fovant and Wylye—famous for their watercress beds. It includes Amesbury, a town in the north of the district lying on the Avon and situated on the main London to Exeter road. Three miles west of the city is the ancient borough of Wilton, once the capital of Wiltshire and now well known for its carpets.

Surrounding Salisbury are the rolling chalk downs, between the river valleys, rising to over 600 feet in places. Little habitation is to be seen, as the villages and hamlets were all built, with their farmsteads, in the valleys. Ancient man, however, was perhaps more adventurous. He occupied the hilltops, as can be seen from the wealth of barrows and earthworks to this day. Stonehenge lies on Salisbury Plain—a monument to our ancestor's ingenuity, for these great stones are not from a local source, and must have been carried great distances. More recently, groups of beech trees were planted in fields between Amesbury and Stonehenge. These are the Trafalgar trees, and represent the actual positions of the English and French ships at the commencement of the battle of Trafalgar.

Some five miles south-east of Salisbury, and beyond the last chalk ridge, are the parishes of Redlynch, Landford and Whiteparish. This area is on the fringe of the New Forest, with its magnificent trees, heath lands and wild ponies, and it has a character entirely of its own. The farms are small, and are generally family businesses, having London clay, Reading beds and Bagshot beds as a basis of their soils. Much of the area is afforested, and drainage is

frequently a problem. The basis of the farm economy is milk production, often with stock rearing as a sideline.

A typical downland chalk farm will run to several hundred acres. The house and buildings are invariably situated in the river valleys, on one of two roads, one on either side of the river. Each farm has some river, or flood meadows in the valley basin, originally drowned through the winter and at intervals through the summer via a complicated network of flood hatches and channels. The farms are long and narrow, running up the valley sides, to the more level land on the top. Originally, sheep used this part of the farm, but now, thanks to modern machinery and fertilizers, these areas are ploughed and sown.

The farming systems practised revolve around the changing of grass with cereals, although occasional crops of sugar beet and potatoes can be seen, as well as kale for the dairy herds. Barley is the important cereal, because good quality samples can be grown and yields are high. The grass is used principally by dairy cows, although many farms carry sheep and beef animals. Many of the dairy herds are milked in movable bails, a method developed in this county for cheap milk production between the two world wars. Nowadays, few herds are outwintered, as even this light land can tread badly in the winter, producing very little grass for several months afterwards. Many people have erected covered yards for their cattle for the winter months, often incorporating self-feed silage. Good use has been made of available grants, the asbestos-roofed buildings sitting discreetly among the downs. Some farmers have put these new buildings nearer the centre of the farm, thus avoiding unnecessary walking by the animals for grazing.

The valley water meadows are often a problem. Owing to present-day wages, few can afford to drown this land, as was the intention. Many are inaccessible to modern machines, and most of them are uneven. Occasional ones have been ploughed and re-sown, and some people favour grazing with sheep, which was traditional many years ago. This is being done with success; the sheep are doing well and the grass is being considerably improved.

Besides the more usual pest and disease troubles associated with cereal growing, there is another that affects many farms. The soil on the tops of some of the downs is black and puffy—almost peaty, and certainly having a high organic matter content. Cereals have often failed on this land in the past, or the yield has been very poor, the grain being small and shrivelled. This was thought to be primarily due to the take-all fungus until recently, when experiments have shown a lack of soil copper. A deficiency of this element interferes with the nitrogen metabolism of the plant. If the crop is sprayed in the late spring with a simple copper compound, it yields well, and the difficulty appears largely to have been overcome.

Farms in this area have seen considerable changes over the past two or three decades. No doubt even greater revolutions will take place in the future. The emphasis has moved quickly from the extensive farming of the 1930s to one of intensive cropping and stocking. Economics have forced the pace, and will continue to do so. Fewer men are now employed, and machines have taken the place of horses. Considerable capital sums have been injected to help reduce costs, or improve buildings and equipment. New techniques, both in management and husbandry, are eagerly studied. Among this ever-increasing pace, people must relax. What is better than shooting over these rolling farmlands? This, here, is a traditional sport, and cannot be hurried.

H. HOLLINRAKE
Agricultural Land Service, Cambridge

Thoughts on Cattle Yard Design

SHALL we have steel, concrete or timber buildings? This is likely to be the first thought. Second thoughts will be on price. Well, up to about 35 ft spans there is little difference in the costs. Over 35 ft, whilst timber can still be competitive, it has to revert from a portal frame to a type of truss where clear headroom is lost. Steel and concrete remain equally competitive in portal frames up to about 55 ft. Thereafter steel begins to win the day.

But we still have to consider maintenance. Given a concrete frame up to British Standard specifications, maintenance is virtually nil. Steel requires painting from time to time, but this can be reduced considerably by having the steelwork hot-dip galvanized. This will cost approximately £22 per ton extra. It will probably last 20 years without further treatment. If timber is pressure treated its life without maintenance can range from 30 to 60 years. As a further thought, however, suppose we wish to make additions or modifications in the future—a highly likely event! Well, timber is undoubtedly the 'kindest' material on which to start chopping and changing. One can drill and fix it to steel. I don't think it unfair to say that concrete hardly offers the same scope.

On the face of things shape or profile would hardly seem to matter. But it does. Consider some of the relevant dimensions. Eaves height needs to be 10 to 12 ft, not so high as not to give shelter, but high enough to permit mechanical cleaning; but, to reduce labour costs to a minimum, the cover must also accommodate hay, straw and possibly silage, and for this kind of storage we need height. If these 'bulks' are placed in the centre where we have greatest height, it virtually divides the yard into two, and no matter how we orientate the building, whilst one yard has an ideal aspect, the other will have a bad one.

One alternative is to clad the building on the weather side, which is adding to cost. A further possibility—and this is commonly done—is to house these 'bulks' under a Dutch barn type of structure and carry down a lean-to under which to house the stock. This is quite satisfactory until the area housing the straw is altered and the cattle go beyond the stanchions. Then we face a row of pillars to form a merry-go-round when cleaning! How much better

if the floor space is completely clear—and it can be done. What is needed is an unequal sided frame—height at one side, say 18 ft, a short pitch up to the ridge, and a long pitch down to about 10 ft at the other side. Thus the greatest height is thrown towards the rear of the building and this houses the bulks. Like most other things, the ideal costs more—possibly 20 per cent. Incidentally, steel structures lend themselves best to such one-sided treatment.

So slatted floors don't look very promising for housing milk cows! They show more promise with beef and calves, and this is good for the man who has to buy-in straw. But what's the answer for the dairyman in the same position? Is it a return to the cowshed? There is a lot to be said in favour of such a move, but this article is concerned with yards. As most dung is dropped where the cattle feed, an area of slats immediately behind the mangers would leave a minimum area to be strawed. A wall sufficiently high to divide the two areas and contain the build-up of dung would be necessary; alternatively, a movable timber wall might be used. A number of breaks in the wall would give access on to the slats.

On many farms the sludge collected under a slatted area cannot be disposed of. In this case a plain concrete apron behind the manger which can be scraped daily would be the answer. Such an operation, properly organized, should take no longer than 15–20 minutes a day for a herd of 60 cows. The apron could be scraped directly on to a trailer or pushed to a concrete area outside the yards and left for later handling.

The influence of the area allocated per beast on straw usage has been observed at widely differing stocking rates. From such observations it seems that there is an optimum of 40 sq. ft per beast where a sleeping area only is strawed, and 80 sq. ft where the whole of a covered yard is strawed. These figures are subject to careful design, as, for example, the avoidance of continual cross cow traffic in the area.

But far more signficant than either optimum areas or design is the standard of management. This has been clearly demonstrated in some limited surveys of straw usage as being of primary importance where conditions varying widely from those considered ideal have shown minimum straw usage and clean cattle to be possible. The surveys are being repeated this winter on a wider scale and geographical basis.

Whether tower silos and their product—haylage—will be more widely adopted is as yet uncertain. The use of mechanical feeders of one kind or another will certainly increase. The important point in considering yard design, is whether the basic layouts now generally adopted will fit into such systems. This is very important to the man erecting new yards at the moment, yet not wishing at this stage to commit himself to heavy capital expenditure on these other newer systems. It seems that no particular problems are likely to arise. Where such systems are in use the yard designs could be considered as conventional, and a study of the way in which such systems are used leads one to the same conclusions.

I wonder how many farmers have noticed the difference in conversion ratio between a yard of beef cattle in a really warm and sheltered covered yard, compared with those in a cold and partly open yard? Just occasionally, observant farmers in my own locality bring this point up. Would it be economical to consider climatic conditions more carefully when designing for the future? It's an interesting thought!

The Ministry's Publications

Since the list published in the August, 1962, issue of *Agriculture* (p. 242) the following publications have been issued.

MAJOR PUBLICATIONS

Copies are obtainable from Government Bookshops (addresses on p. 304), from any Divisional Office of the Ministry or through any bookseller at the price quoted.

BULLETINS

No. 87. Beans (Revised) 3*s*. (by post 3*s*. 4*d*.)

A description of the various kinds of beans grown as vegetables and their cultivation, with notes on processing, canning, drying, freezing, diseases and pest control.

LEAFLETS

Up to six single copies of Advisory leaflets may be obtained free on application to the Ministry (Publications), Ruskin Avenue, Kew, Richmond, Surrey. Copies beyond this limit must be purchased from Government Bookshops, price 3d. each (by post 6d.).

ADVISORY LEAFLETS

No. 339. Chrysanthemum Eelworm (Revised)

No. 360. Outdoor Tomatoes (Revised)

FARM MACHINERY LEAFLETS

No. 23. Mechanical Thinning and Gapping of Row Crops (Revised) 6*d*. (by post 9*d*.)

OTHER PUBLICATIONS

Domestic Food Consumption and Expenditure 1960. 12*s*. 6*d*. (by post 13*s*. 2*d*.)
(The Annual Report of the National Food Survey Committee.)

FREE ISSUES

Obtainable only from the Ministry (Publications), Ruskin Avenue, Kew, Richmond, Surrey.

At the Farmer's Service, 1962.

IN BRIEF

More Watts on the Farm

It seems that many farmers use electricity for little other than domestic purposes. Is this because its use in farming does not pay? Recently four farms in south-west England were used as 'guinea pigs' to answer this question. The farmers agreed to install and use electrically-powered equipment to the extent suggested by the Electricity Board, and records were kept of what happened as compared with a period before they had mains supply. The idea was to study the effect on profit of mains electricity when it was used as it should be.

This effect can be measured partly by the direct financial result, which depends on running costs and the cost of the equipment, and partly by the side effects which can rarely be measured exactly in financial terms but in the long run are bound to affect profits. For instance, there is the greater speed, convenience or effectiveness of electrical operation. Also, the operations themselves are different —in simple ways, like the use of more hot water when it is readily available, and in more far-reaching ways, as when more corn is grown or pigs kept because there is time for it.

The 'direct financial result' on the four farms studied was about the same as with the previous methods: the real benefit came with the side effects. These were worth about £300 per farm, of which £100 was the value of labour saved.

The capital cost of the equipment and its installation over the four farms amounted to £1,000 per farm. £300 added to profits is a worthwhile investment. Some useful points may be picked out of these recorded experiences.

Pigs were kept on two of the farms. Both farmers were emphatic as to the reduction in losses of suckling pigs that resulted from the introduction of infra-red lighting. Less sow-feed was needed to produce the required number of weaners, and more pigs could be fattened in the space vacated by sows. Release of labour from other chores enabled the number of pigs to be increased.

Mills and mixers were installed on all four farms. In two cases this replaced a practice of sending away home-grown grains for processing: at £1 per ton the home processing was half the price.

Three of the farms were dairy farms, and here the power for milking proved the most advantageous of all the applications of electricity, even though the total sum of money involved is relatively small. Savings ranged from £30 to £50 per year. Water heating for the dairy was about the same as before but a far better service was provided.

Animal Health in 1960

Foot-and-mouth disease was more serious in 1960 than in any year since 1952. There were 298 outbreaks in Great Britain and for the first time in seven years the disease spread to Scotland. Fowl pest outbreaks continued at a high rate but anthrax and swine fever decreased slightly. The year 1960 also saw the successful completion of the plan to eradicate bovine tuberculosis in Great Britain.

These facts are taken from the comprehensive Report on the Animal Health Services in Great Britain for 1960,* which also explains the methods used to restrict the introduction and spread of animal disease in this country, and gives results of experiments undertaken by the laboratories and on farms to diagnose, control and

eradicate animal disease. Information is also included about exports of livestock and various products, and the protection of animals during transit.

**The Report on the Animal Health Services in Great Britain, 1960.* H.M.S.O., price 6*s.* 6*d.* (by post 7*s.*)

Reporting Fruit Research

The current issue of *Experimental Horticulture* (No. 6) will be of special interest to fruit growers. It gives an account of highly practical experiments with strawberries, black currants and apples.

The high yields in the strawberry cropping trials at four centres may surprise growers. All are from virus-free plants and have been calculated from small experimental plots. Cambridge Favourite cropped at the rate of 9 tons per acre, but of course this yield may not be so easily repeated on the larger areas planted on most strawberry farms. The earliness of crops under Dutch lights at Rosewarne is not surprising, but it is remarkable that the corresponding pickings at Stockbridge House, in Yorkshire, 200 miles north of Efford, were only 3–12 days later than those at Rosewarne. Cambridge Prizewinner did well as an early, both in frames and in the open.

In view of the steady demand for black currants in recent years growers will be interested to see that the midseason variety Raven has come to the fore in a series of trials covering five centres. The value of a mulch for black currants has been confirmed in observations at Efford.

Studying the pressing problems of apple mildew, Mrs. June Baker has investigated the part played by removing infected buds and shoots during winter pruning. This will be one prong of the attack on this disease. The other is spraying during spring and early summer.

The apple rootstocks MM 104, 106 and 111 have been found to give better yields with Cox and Laxton's Fortune in eight years' work at Luddington. MM 111 was particularly interesting, since it withstood the drought of 1959 much better than Malling II.

Ploughing the Zuider Zee

This year's World Ploughing Championship (the 10th) will be held in the Netherlands—on the polderland of Oostelijk Flevoland, which five years ago was at the bottom of the Zuider Zee, now renamed the Ijsselmeer. Here, stretching away to the horizon, are some of the world's newest farmlands. After the Ploughing Contest the new holdings, close to the village of Dronton (still being constructed), will be occupied and settled by Dutch farmers.

A stone monument, carrying the name of each participating country, will be surmounted by the emblem of the 'Golden Plough', and bear the inscription *Pax Arva Colat, Let Peace Cultivate the Fields.*

Broom's Barn Experimental Station

The Minister of Agriculture, the Rt. Hon. Christopher Soames, C.B.E., M.P., opened the Broom's Barn Experimental Station at Higham, Bury St. Edmunds, on 27th July. Broom's Barn Farm (190 acres) was acquired in 1959 by the Lawes Agricultural Trust Committee and has been developed as a research station to study sugar-beet growing. The land, new farm buildings and laboratories have been paid for by grants from the Ministry of Agriculture's Sugar Beet Research and Education Fund, to which both sugar-beet growers and the British Sugar Corporation Ltd. subscribe.

This Experimental Station replaces the Rothamsted Field Station, Dunholme, near Lincoln, where research for the Sugar Beet Research and Education Committee has been done since 1947.

The ultimate aim of all the work is to improve the health and yields of both the root and seed crops. To this end, field experiments and observations, supported by the necessary glasshouse and laboratory work, are made to elucidate the biology of pests and pathogens, to assess the damage they cause, and to find how the losses can be reduced. The research workers co-operate closely with the field staffs of the sugar factories in field experiments, in recording the incidence of pests and diseases, in organizing a spray-warning scheme to advise growers when to spray their crops against aphids that threaten to spread yellows, and in the certification of mangold and sugar-beet stecklings.

The work on manuring aims at ensuring that fertilizers are used most efficiently and economically. Each year many field experiments, done in conjunction with the British Sugar Corporation, test responses to a range of fertilizers applied in different ways. Laboratory methods of forecasting these responses are investigated. This work will continue and be expanded at Broom's Barn, where it will also be possible to do long-term experiments on the effect of fertilizers, cultivations, crop rotations and agricultural chemicals (weed-killers, insecticides and fungicides), and to study irrigation of sugar beet.

Thatchers in Difficulty

Lack of the right kind of material—long straw, combed wheat reed and Norfolk reed—is causing a deal of concern among thatchers. This point is made in the Annual Report (1961-62) of the Rural Industries Bureau.

The increase in the use of combine harvesters has all but severed the direct link between farmers and thatchers. More and more the latter have had to depend on contractors and dealers for their main supplies of straw. Outside Devon, Somerset and Dorset, few contractors are equipped with reed combers, and this type of thatch is now in demand well beyond its native south-west area. Consequently, supplies are extremely scarce and during the past season prices have risen astronomically. The Bureau urges that more reed combing machines should be installed in suitable districts.

Persistently high-water levels in the Norfolk marshes during the winter and spring of 1960-61 curtailed the harvesting period of Norfolk reed; normally it goes on from November to March. As the season advanced, comparatively little reed was obtained from Norfolk, and thatchers had to turn to Holland for their supplies.

'If it is true,' says the Bureau, 'that no more than a relatively small proportion of Norfolk's reed-bearing marshes is consistently harvested, then much could probably be done by landowners to remedy this paradoxical situation. With the help of mechanical cutters, a number of which are now effectively used on the marshes maximum output in the period available could be achieved. Over a period of years property owners, architects and builders have come to realize that a Norfolk reed or combed wheat reed thatch, though initially expensive, is durable, and they stipulate the use of these materials'.

Brewer's Yeast and Dairy Cows

Experiments in Russia and in Germany have shown that the feeding of fresh brewer's yeast or an active yeast concentrate to dairy cows resulted in an increased production of butterfat. In two trials at Great House E.H.F. fresh brewer's yeast was fed to Ayrshire dairy cows in addition to their normal rations of hay, kale and concentrates. The yeast was fed at the rate of 1 lb per cow per day for one month in the first trial, and in the second trial 22 lb per cow for six days.

The results of both trials showed that the feeding of fresh brewer's yeast did not improve milk yields or compositional quality.

It seems unlikely that the anaerobic conditions and temperature of the rumen will favour the establishment and activity of a yeast colony, and it is difficult to see how yeast fermentation will help in the production of precursors of butterfat unless the strain of yeast used is a very unusual one. *Reported in 'Experimental Husbandry' No. 8*

Books

Soil Animals. D. K. McE. Kevan. H. F. and G. Witherby. 30*s*.

Until 1955, when Professor Kevan made such a good job of editing the Proceedings of the University of Nottingham Symposium entitled *Soil Zoology*, there was no publication which brought together all the facets of this unduly neglected field. This latest book aims at presenting a general introduction to the soil fauna in just over 200 pages, and succeeds admirably, being well written and comparatively inexpensive. Many trained zoologists have only a poor idea of the vast numbers and kinds of animals present in soil, and the book may well appeal not only to them but to all who are interested in animal biology. It is a little unfortunate, however, that it is published so soon after the English translation of Professor Kuhnelt's book *Soil Biology*.

After an introduction, there are two very readable chapters outlining the wide variety of animals that are found in soil, and a further section which gives some idea of the anatomical and physiological modifications that fit animals for existence in soil. These are followed by a chapter somewhat misnamed 'Sampling and Extraction', where the important topic of sampling is dismissed in half a page, while twenty-three pages are devoted to methods of extracting animals from soil. This is unfortunate, because no matter how efficient the method of extraction, the picture obtained will be quite erroneous if the samples taken are of the wrong size or number, or badly distributed.

The section on ecology of soil animals contains a great deal of interesting information, but it is rather confusing in its layout, partly due to the style of printing, which does not differentiate sufficiently between main and sub-headings. The chapter could profitably have been extended and related to work on economic insects. The book concludes by examining the effects of human activity on the soil fauna and of animal activity on the soil, but a final discussion on the significance of the soil fauna to man and agriculture would have been a valuable addition.

Nevertheless, Professor Kevan has written a useful book which will no doubt find a place on the bookshelves of many biologists and pedologists, and will greatly stimulate interest in the many problems that remain unsolved in the field of soil zoology.

C.A.E.

Medieval Technology and Social Change. Lynn White, Jr. Clarendon Press: 30*s*.

The slightly forbidding title should not deter the general student from buying and reading this most valuable and stimulating book. In ground-plan it consists of three studies: one on the origin of the feudal aristocracy, one on the agricultural revolution of the early Middle Ages, and a third on the medieval development of mechanical power.

Readers of *Agriculture* will be particularly interested in Chapter II. It is divided into four sections dealing with the Plough and the Manorial System, The Discovery of Horse-Power, The Three-Field Rotation and Improved Nutrition, and the Northward Shift of Europe's Focus.

The author believes that the heavy plough cannot safely be dated earlier than the sixth century. It reached England in the later ninth century as a result of the Viking invasions, and brought about a wide diffusion of common-field tillage, besides changing the basis of tenurial allotment. 'The standard of land distribution ceased to be the needs of a family and became the ability of a power-engine to till the earth. No more fundamental change in the idea of man's relation to the soil can be imagined: once man had been part of nature; now he became her exploiter.'

The next step was to develop a harness which would make the horse an economic asset. A new kind of collar enabled horses to take the place of oxen in ploughing, with a consequent increase of productivity. The increase was carried to still greater heights when the older two-course rotation of crops was ousted by the new three-course plan. Evidence of this is cited from the late eighth century on the Continent; it seems not to have reached England until the twelfth century. The new triennial rotation allowed room for an expanded growth of leguminous crops, particularly of field peas (*pisum sativum*), and this in turn profoundly affected the nutrition of all classes. Hence a new 'exuberance of spirits' which did much to shape the history of northern Europe from the tenth century onward.

Footnote references point the way to further reading, and some 40 pages of additional notes are provided for the inquiring specialist. The skill with which the author has epitomized a great mass of learning is as admirable as the straightforward clarity with which he presents his results.

H.P.R.F.

Oats and Oat Improvement. Edited by F. A. COFFMAN. American Society of Agronomy. $11.50.

This account of oats is Volume 8 in a series of monographs being prepared under the auspices of the American Society of Agronomy. The book comprises fifteen chapters and, including the Editor, F. A. Coffman, fifteen authors have collaborated in its production. As might be expected from a compilation of this kind, there is a very extensive citation of literature and a full index.

The book is the most comprehensive on oats that has been written in the English language; there are chapters on world importance and distribution, origin and history, morphology and development, classification, cytogenetics, genetics, breeding, diseases and pests, and the influence of weather and physiological factors. These subjects have all been treated comprehensively and have little bias towards American conditions, except in the treatment of diseases. On the other hand, the later chapters, such as those dealing with culture and production, seed production and distribution, marketing and processing, etc., do have associations with the American continent.

The book is very well written and produced, has excellent illustrations covering a wide range of subjects, and is a most valuable source of information on oats. There is no other book which covers the crop so completely, and it can be very strongly recommended. Available from The American Society of Agronomy, 2702 Monroe Street, Madison 5, Wisconsin, U.S.A.

G.D.H.B.

Recommended Common Names for Pesticides. BRITISH STANDARD 1831:1961. British Standards Institution. 15*s*.

The large and increasing number of complex chemicals used as pesticides, and the marketing of these under various trade names, calls for some rational approach to identification if the users are not to be hopelessly confused.

Provision of common or trivial names is undertaken by a committee of the British Standards Institution on which interested parties, including Government and Industry, are represented.

This booklet lists over a hundred pesticidal chemicals for which common names have already been coined, together with their structural formulae and chemical names adopted by the Chemical Society. The index provides a cross reference from chemical name to common name. An appendix gives a list of chemicals deemed not to require common names because the chemical names are reasonably short or distinctive, e.g., formaldehyde, mercuric chloride.

It is of interest to note that common names are recorded, but not registered as trade marks, by H.M. Patent Office to pre-empt their use as trade names and thus avoid conflict. Close liaison is also maintained with the Commonwealth, Europe and the U.S.A. through the International Standards Organisation (I.S.O.): thus preferential consideration can be given to names first officially adopted elsewhere.

All concerned with pesticide research and manufacture should have a copy of this useful publication.

E.A.R.

Report of the Welsh Plant Breeding Station, 1961. 10*s*.

This is the third annual report published in its present form, and is well up to the standard of those of previous years. Reports from the various departments deal with the work in progress covering the field of breeding and testing of the Grass, Legume, Cereal, Bean and Brassica crops.

Much of this work, at first sight, does not appear to be of immediate interest to the practical agriculturist. To the more discerning it will be obvious that there are many lines of investigation which promise to be of benefit to the farmer. The report includes a number of short papers in which problems of special interest are dealt with in greater detail.

The breeder is paying attention to a more detailed appraisal of the role of environment in his work. Plants from the Mediterranean regions are providing material which has the ability to grow at low temperatures and this, it is hoped, will provide further new varieties. There is the exciting problem of new varieties of herbage plants with higher nutritive value to the grazing animal. A new laboratory technique for assessing this is enabling the breeder to speed up the process of plant selection.

With breeding goes the problem of seed multiplication. Investigations continue towards ensuring maximum seed yields from varieties which more often prove to be 'shy-seeders'. The use of gibberellin and related chemicals seems to open a new avenue in this work.

New varieties released by the Station and in the process of multiplication include: S.231 (perennial ryegrass); S.341 (cocksfoot); S.352 (timothy); S.236, Maelor (spring oats); S.237, Padarn (winter oats).

The Director and his staff are to be congratulated on the insight into their work which this report shows. Copies are obtainable from the University College of Wales, Aberystwyth.

J.D.

Potash Deficiency: Detection and Correction. POTASH BOOKLET No. 4. 3*s.* 6*d.*

Although the exact functions of potassium in the growing plant are not yet clear, it is known to be an essential nutrient concerned with such important processes as respiration, photosynthesis, protein formation and general vigour. Most soils contain large amounts of potassium, but only a small proportion is available to plants.

Published by the Field Service Department of Potash Limited, this 32-page booklet discusses very briefly the factors affecting the soil's ability to meet the potassium requirements of growing crops, and then deals in more detail with the occurrence and diagnosis of potassium deficiency. Fifteen excellent colour plates show the visual symptoms associated with lack of potassium in the major agricultural, vegetable and fruit crops.

Somewhat similar symptoms can be produced by other causes—disease, insect attack, drought, impeded drainage, frost and wind damage. Hence to confirm suspected potassium deficiency, leaf and soil analyses, and past cropping and fertilizer history should also be considered. Potatoes, cauliflowers, marrow-stem kale and beans are listed as the most reliable indicators of potassium shortage, being especially susceptible and showing characteristic signs when soil supplies are inadequate.

Top dressings with potassium fertilizers may serve in emergency to prevent serious crop losses, but a more satisfactory course is a review of the whole fertilizer programme aimed at correcting the long-term balance. Useful figures are quoted—without, however, reference to original sources—showing the units of N, P and K removed annually per acre by various crops. Copies may be obtained from the Field Service Department of Potash Ltd., Norfolk House, St. James's Square, London, S.W.1.

S.L.

John Innes Institute 52nd Annual Report, 1961. 3*s.*

This Report is of special interest to those who have studied the establishment, growth and development of the Institute since it moved to Bayfordbury about thirteen years ago. No serious or lasting effect seems to have resulted from the disruption. Lines of investigation have continued under different conditions, in new surroundings, with better facilities and with the same thoroughness that typifies the Institute. It is not surprising, therefore, that the present unostentatious publication contains much to interest workers in many different spheres of the complex horticultural industry.

Few institutions have done more of practical value to the industry, and growers all over the country look back with pleasure to the period when Mr. Lawrence's voice was heard giving practical advice in a very direct manner to those actively engaged in the industry.

The sound basic research from which valuable information derives and good practical advice is made possible, is well described, although frequently couched in terms which are foreign to many, if not most, practical horticulturists. It is perhaps not to them that the Report will make its greatest appeal, but it contains much which is of importance to the industry, particularly fruit and tomato growers.

In the department of physiology and plant culture the investigation into the relationship of light and temperature is of special interest; so, too, are the efforts made to identify more precisely the nature of the rogue character of young tomato plants, a long-standing problem which is still shrouded in mystery.

Fruit growers will be particularly attracted to Dr. Dodd's report on the work of breeding new varieties—a line of utmost importance to the industry. Foremost, perhaps, is the task of breeding for resistance to apple scab. Varietal reaction of some hundred varieties of sweet cherries to the organism responsible for bacterial canker and the possibility of breeding varieties of tomato resistant to tobacco mosaic virus, are also being examined.

Although it tends to be unintelligible to the grower, the report on potato genetics

will be of interest to many geneticists, particularly the assessment of resistance and the breeding of scab-resistant lines. Resistance to virus and blight have a prominent place in the programme.

There is a great deal more in the field of scientific research. The report is well presented, is printed in clear type, and the price is modest. Copies can be obtained from the John Innes Institute, Bayfordbury, Herts.

H.F.

The Preservation of Timber. W. P. K. FINDLAY. A. and C. Black. 25*s*.

Once upon a time timber was used for practically all constructional works, and there are still some who can recall writing into specifications such splendid names as 'Baltic or White Sea Yellow', 'Swedish Yellow', 'First Quality Petrograd' or 'Archangel'.

These materials (and perhaps the writers) belong to a bygone age, and two world wars have seen timber disappear from this island, to re-emerge under strange and exotic names such as 'Muhuhu', 'Sequoia', 'Isoko' and 'Opepe'. At the same time, a generation has arisen which is moved to inquire into the properties of timber as a suitable building material.

So, despite the evidence of Westminster Hall, the Lantern at Ely, and many venerable mansions up and down the British Isles, it has become necessary to start again from the beginning.

Dr. Findlay's new book examines the problems which arise in the modern uses of timber, with special reference to the new types which are available. The case for preservation arises out of the modern shift from durable, or 'hard', woods to the softer varieties. He recalls the misfortunes which befell even the 'immemorial oaks' when they were used in ship construction with inadequate ventilation, and how rock salt provided a measure of preservation against rot and decay.

Modern research has revealed that timber is not susceptible to decay solely by the measure of its softness, and that resistance can be attributed to the presence in the material of substances which are toxic to wood-destroying fungi.

The various methods of preservation are examined in detail and a useful section is devoted to the properties of many brands of preservatives.

Among a wide range of timber uses, the important subject of fire-retarding treatments is covered, as well as the repair and preservation of antique furniture.

Dr. Findlay modestly describes this work as a collection of material already published in official bulletins or leaflets, but in editing this wealth of information, he must take credit for the production of a valuable, detailed and eminently readable book which will be a constant aid not only to the young men who are rediscovering the many uses of timber, but also to the old fogeys with long memories.

F.W.H.

The Aberystwyth Varieties of Oats. LEAFLET SERIES S No. 8. Welsh Plant Breeding Station. 2*s*. 6*d*.

The publication of this booklet will surely be welcomed by all agriculturists who have an interest in the oat crop. A record of the botanical and field characteristics of the varieties produced at the Station is of fundamental importance for the identification of varieties, and becomes increasingly so as new material is derived from parental combinations which differ little in botanical characteristics.

The varieties themselves are a testimonial to the work of the Station, and particularly to the outstanding pioneer research work of E. T. Jones, the architect of the modern oat variety. Success has not been confined only to the production of stronger-strawed, larger-grained and high-yielding varieties, but resistance to oat stem eelworm has been incorporated in S.172, Pennant, S.225 and Manod, resistance to mildew in Padarn, and resistance to both mildew and crown rust in Manod.

For good measure, the booklet includes some brief notes on the cultural aspects of oat growing; the role of weed control materials in the crop, with a reference to some of the herbicides that may be used; and the flow of genetically pure seed from the station, via cereal certification schemes, to the seed trade and the farmer.

The publication emphasizes the value of good crop husbandry in oat growing. It reviews the Station's objectives in the breeding of new material and refers to the attention given to environmental adaptation of varieties. The latter must certainly be of great importance at the present time. Evidence from various sources seems to indicate that, apart from very extreme conditions where the crop is uneconomic in any case, environment is less important than is generally believed, provided husbandry standards are adequate. Copies are obtainable from the University College of Wales, Aberystwyth.

E.I.P.

Soil Organic Matter. M. M. KONONOVA. Pergamon Press. 80*s*.

There are two main viewpoints on soil humus, firstly, its agronomic relationships in respect of nutrients and soil structure, and secondly, its chemical nature, the biochemistry of its formation, and the part it plays in the soil formation.

This book is mostly concerned with the second approach and is therefore of particular interest to chemists, biochemists and pedologists. The author is the leading authority on soil humus in the U.S.S.R., and in bringing her book up to date for translation, her hope is that this English edition will introduce the Russian work on humus to a wide circle of readers. About half the 900 papers referred to in the text are by Russian workers.

The first chapter gives an historical review of the scientific ideas on humus from the middle of the eighteenth century to the present day. Then come lengthy chapters on the composition of soil humus, its formation, and its effects on the soil minerals and on plant growth. This latter subject includes a discussion of the effect of growth-promoting substances in humic materials. The amount and composition of the humus of the main soil types of the U.S.S.R. are discussed, and there is a general description of the soil types.

Chapter 7 contains much of interest to the agronomist. It deals with the changes in soil organic matter under different systems of cultivation, and on different soil types. The experiments quoted are entirely from Russian sources: similar work better known to English readers has been done in England, United States and elsewhere. The subjects dealt with include the loss of organic matter in breaking up virgin soils for arable cropping; the effect of farmyard manure in raising the organic content of soils; accumulation of organic matter under natural vegetation, and under perennial grasses, with estimates of the amounts of organic matter supplied by the root residues of various grasses and legumes; the effect of grass roots on soil structure and the duration of the improvement.

The translators have done an excellent job in making this Russian work available to English-speaking scientists. *H.V.G.*

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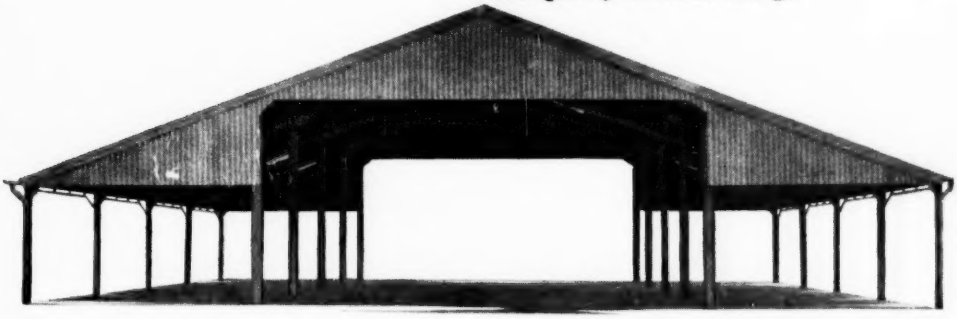

THE BUILDING ILLUSTRATED IS 60′ LONG × 40′ WIDE × 18′ HIGH PLUS TWO LEANTOS EACH 60′ LONG × 20′ WIDE—AREA 4,800 sq. ft. TODAYS PRICE APPROX. 5/10d. per sq. ft. SUPPLIED AND ERECTED EXCLUDING FOUNDATIONS OR 6/4 per sq. ft. INCLUDING FOUNDATIONS

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Planning for a really good crop this winter? Then plan wisely with 'CCF' No. 1—ICI's most famous, proved and trusted compound. Its well-balanced plant food proportions of 12% nitrogen, 12% phosphate and 18% potash make it the ideal fertilizer to put in autumn seedbeds—to give you all the corn you plan for.

Profit by Early Delivery Rebates

Put your order in for 'CCF' No. 1 early—now if you can. This way you make a twofold profit. A saving on the cost of your No. 1 (and the sooner you take delivery, the bigger the rebate) and the best possible returns from your autumn-sown cereals. That's good business, sound planning—and it starts the moment you call your ICI agent.

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If you are among the farmers who have a special preference for a low nitrogen compound ask for ICI No. 3. This new fertilizer contains more plant food than other low nitrogen, high phosphate and potash compounds. Actual proportions are 10.20.20—a total of 50 units.